PAPER TRADE JOURNAL

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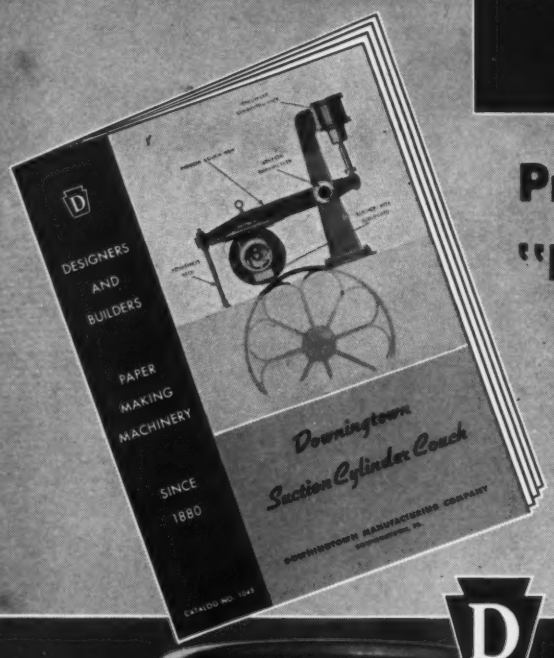

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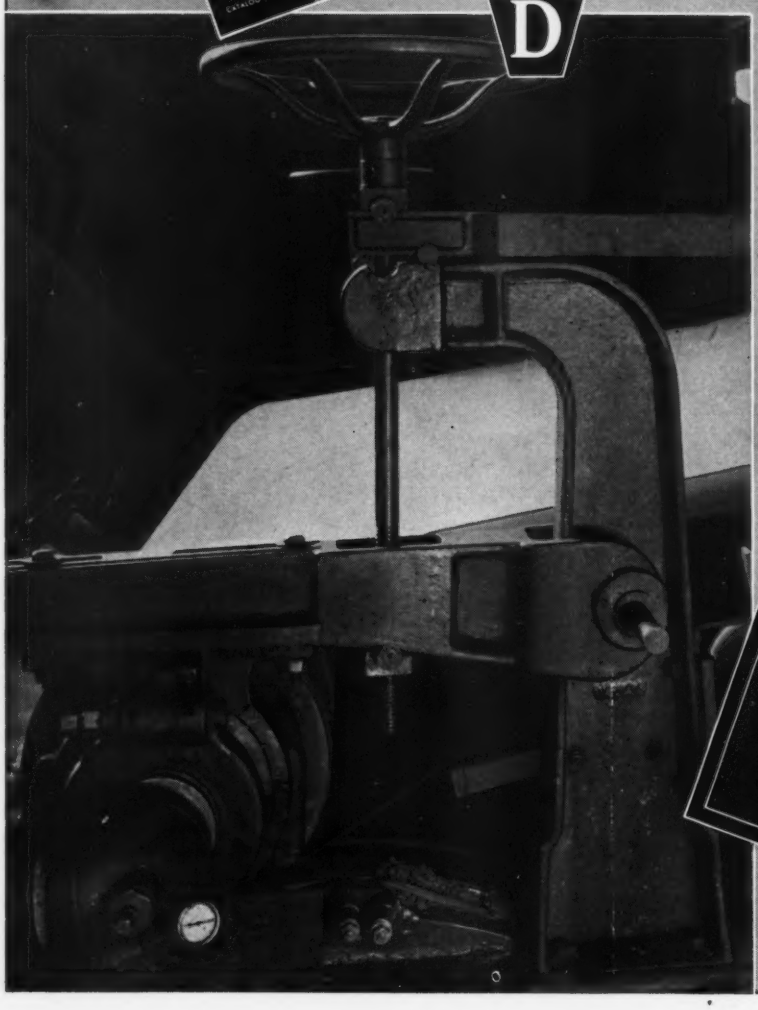

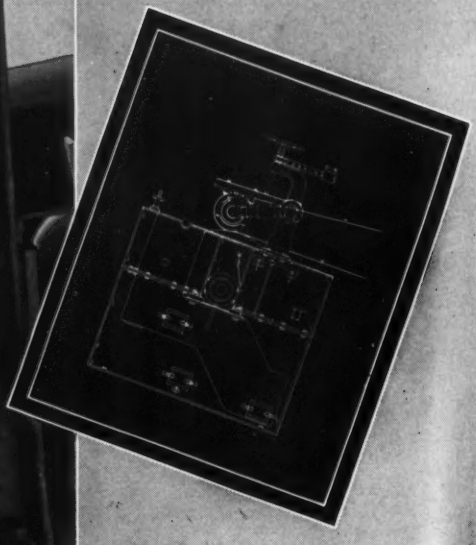

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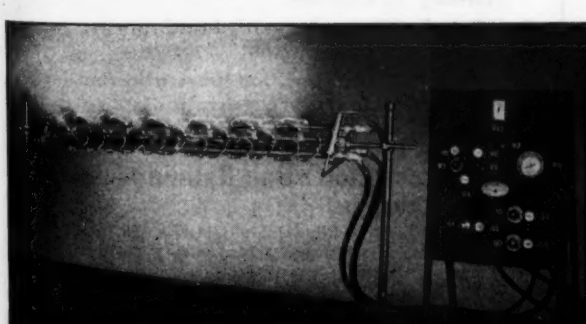

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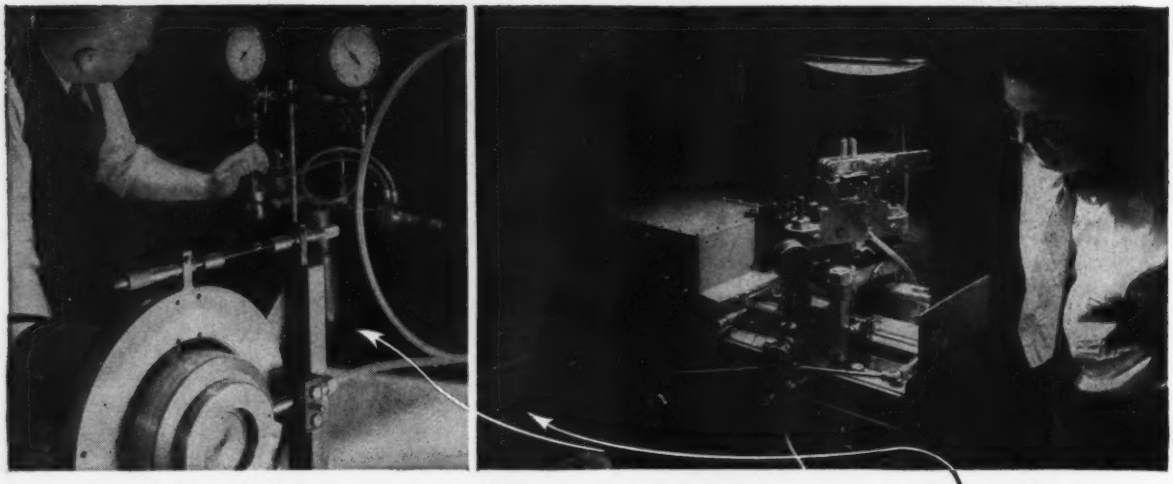

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Vol. 122. No. 8

PAPER TRADE JOURNAL

Title Reg. U. S. Pat. Off.

February 21, 1946

Wisconsin to Start Large Forestry Program

State In Collaborating With Wood-Using Industries Will Aim To Guarantee the Security of the Paper and Pulp Industry Through Adequate Supplies of Pulpwood — Other Late Industrial News.

WAUSAU, Wis., February 18, 1946—At the first forestry conference held in Wisconsin since 1928, representatives of wood using industries and members of the State Conservation Commission met here last week to discuss ways and means of inaugurating a stepped-up postwar forestry program.

Folke Becker, President of the Rhinelander Paper Company and President of Trees for Tomorrow, Inc., said that the time had come to face with realism the question of rebuilding a permanent and local source of raw material. He referred to the necessity of some form of localized cutting regulations in order to give immature timber a chance to come back. He also pointed out that a number of the larger mills are going to Canada for pulpwood. He said that if Canada ever restricts the exportation of pulpwood except for owners of pulp mills in that country, it would leave the Wisconsin paper industry facing serious raw material difficulties.

C. L. Harrington, State Conservation Department, stated that it is necessary to plant 2,400,000,000 trees on burned over and cutover land that is not restocking itself in thirty-four northern and central counties. He estimated the job could be accomplished in twenty-five years and that the capacity of the three state nurseries could be stepped-up to 100,000,000 seedlings a year.

S. B. Bugge, President of the Tomahawk Kraft Paper Company, declared that if all suitable land in the state were planted and properly harvested Wisconsin would have a good chance of producing all the pulpwood it needs. He warned, however, that such a development would take years and that certain desirable kinds of wood could not be grown in quantity.

E. B. Hurst of the Consolidated Water Power and Paper Company at Wisconsin Rapids, George Kilp of the Nekoosa-Edwards Paper Company at Port Edwards, N. S. Stone of the Mosinee Paper Mills at Mosinee, and others, spoke on phases of post war forestry activities.

Major recommendations made were:

Legislation to restrict the cutting of undersized timber.

Continuation of the commission's fire protection system with added protection if possible.

Reduction of the 10 cents per acre tax on land registered under the forest crop law. Under this law timber owners pay to the state ten cents per acre on forest land that they agree not to cut.

Continuation of the commission's program to supply trees for reforestation.

Restrictions on the use of fire lanes for fire protection.

Additional research by the federal and state governments into tree disease.

Charles F. Smith, Wisconsin Conservation Commission at Wausau, and Virgil Dickensen, Chairman of the Commission, conducted the conference. It was proposed at the conclusion of the event that a similar conference be held in the north once a year.

Other paper company executives attending the meeting included: Clark Everest, President, Marathon Paper Mills; D. B. Smith, President, Ward Paper Company; F. G. Kilp, Nekoosa Edwards Paper Company; E. M. Miller, Kimberly Clark Company; Frank Fixmer, Mosinee Paper Mills, and C. J. McClaren, Tomahawk Kraft Paper Company. These are the men who are administering the forest plantations until the trees are ready to be put through the mills.

Hold Sectional Safety Meetings

Six sectional meetings of the annual safety school at Wausau, Wis., were held Thursday evening, February 14, at the Vocational school, followed by a talk by Charles Eagle Plume, interpreter of Indian lore, in the Central school auditorium.

Gilbert Schreiber and Eugene Ingalls, both of the Wausau Paper Mills Company, were the chairman and speaker, respectively, at the paper group meeting .George Messerknecht of Marathon Corporation, addressed the building maintenance division.

Dr. Kamm to Address Chemists

Dr. Oliver Kamm, research coordinator and scientific director of Parke Davis and Company, will address the North Wisconsin section of the American Chemical Society Tuesday evening, February 19, at Science hall, Lawrence College, Appleton, Wis.

G. W. Mead Elected a Director

George W. Mead, president of Consolidated Water Power and Paper Company, Wisconsin Rapids, Wis., has been elected to the board of directors of the University of Wisconsin Foundation. He will serve a two-year term.

Chicago Concerned About Wages and Prices

Administration's New Price Policy Awaited To Clarify Present Uncertainty About Paper Prices — Salesmen Look Forward To Paper Week — Demand For Waste Paper At Peak — Other News.

CHICAGO, Ill., February 18, 1946—The Chicago paper industry looked forward to the meetings of the industry, to be held in New York City next week, to clarify several problems which seem, according to local reports, to be having the most direct bearing on the trade. Members of the industry here want to know more about the ideas of the Office of Price Administration in relation to an upward revision of pricing. That particular problem has grown more acute daily as volume necessary to make a fair profit is curtailed owing to shortages in many lines.

It is believed here that the current controversy between those who prefer high wages without price increases and those who believe high wages must be accompanied by higher prices is shortly to be settled in favor of the latter. This school of thought feels the paper industry will be in a stronger position if control remains though on a completely revised plane and one that adequately covers price increases.

Waste paper was reported at ceiling peaks and the demand reported to be stronger than ever. In spite of generally favorable weather, collections were disappointing and old newspapers continued to be needed badly. Mill consumption is reported as very heavy and many mills have inadequate stocks.

Salesmen Hold "Annual Meeting"

The western division of the Salesmens Association of the Paper Industry, now having disposed of its share of the annual meeting of the group, looks forward to the final annual session at the Waldorf in New York on February 25 to secure official over-all approval of its actions here. The SAPEYES held the annual meeting of the western division at the Sherman Hotel on February 11th at which time committee reports were received and elections taken care of for formal announcement after the 25th. Joe Heyer, Cherry River Paper Company, reported as chairman of the Membership Committee which had a most successful year and Ben Babbitt reported for the Social Committee. R. C. Johnson, Fletcher Paper Company told of the very important work being done by the Placement Committee. The western division nominating Committee which reported its selections last Monday, is headed by John Diggs of Mosinee.

F. D. "Pat" Patterson, Flambeau Paper Company, and head of the western division, also made his report on the 11th and the annual report of the SAPEYE President, Stanley O. Styles, was also read. Also submitted and approved was the analysis of the progress of the Association as presented in behalf of Dr. E. O. Merchant, secretary-treasurer of the group.

It was announced that possibly fifty sales executives and officers of Chicago manufacturing and jobbing concerns, planned to make the trip to New York for the meeting of the trade.

Speaks to Professional Group

Roger R. Wilterding of the Ace Carton Corporation, is to be the speaker at the monthly meeting of the Chicago Professional Paper Group to be held Monday evening, February 18. Mr. Wilterding will discuss "Factors in Package Design and Manufacture". The discussion will include factors illustrating how the modern paper package is a combined achievement of the efforts of the paper mill, the package designer, the artist, the printer and the creators of the ingenious machine which cut, glue and fold the cartons at amazing speed.

Mr. Wilterding's association with one of the most progressive converters in the Chicago area renders him well fitted to discuss such aspects of the subject as protection requirements, choice of materials, size and shape, printed design, etc. Also expected to be discussed are the types of machinery and materials used such as inks, adhesives, and fabrication difficulties encountered. The desired improvements in materials which will also receive attention from the speaker.

The dinner meeting will be held in the dining room of the Chicago Bar Association at 10 S. LaSalle Street. Reservations are being made through F. D. Long of the Container Corporation of America.

Speaker at the January 21 meeting was Ellis Frampton, assistant general sales manager of the Hammermill Paper Company who discussed "New Things Ahead for Paper" and covered topics of interest to the several branches of the industry represented here. The group was also shown an interesting film of Hammermill's complete paper-making operation, according to A. G. Hepburn of the Tomahawk Kraft Paper Company.

L. A. Combs Speaks at Conference

Larry A. Combs, director of industrial relations for the Container Corporation of America, was one of the speakers at a three day conference held by the American Management Association at the Palmer House this week. Mr. Combs appeared at a panel session on Thursday afternoon, February 14 where the topic for discussion was "Areas for Management-Labor Cooperation".

To Report on Industrial Relations

P. J. Massey, executive of the H. P. Smith Paper Company of Chicago, will report on the activities of the Waxed Paper Institute's committee on Industrial Relations, at the annual meeting of the waxed paper industry to be held in New York on February 28. Mr. Massey, chairman of the committee, will present a comprehensive survey on the status of the industry's over-all labor situation. It is the result of a study which has occupied a great deal of the time of the committee.

Lt. Colonel Lipp Returns

The J. J. Lipp Paper Company has a new member in its executive family, with the return to civilian life of Lt. Colonel William L. Lipp who has been overseas with the armed forces. Colonel Lipp expects to shortly identify him with the sales program of the company which was founded by his father, Joe Lipp.

FOR PROTECTION AGAINST:

corrosion, discoloration and wear

- nothing equals Stainless Steel!

THE paper industry although so progressive in many ways seems to be an exception in not exploiting to the full the many benefits that Stainless Steel offers.

In contrast take the chemical industry. Today scarcely an important chemical plant but uses Stainless Steel extensively in key equipment and apparatus to lengthen life, reduce the inroads of corrosion, and to avoid product contamination.

In the petroleum industry, refinery bubble towers handling corrosive crudes at high temperatures have for years been lined with Stainless Steel to prolong life almost indefinitely.

In textile mills, whose problems of corrosion, color matching and elimination of staining closely parallel those of the paper mill, Stainless Steel is being increasingly applied to improve the product and lower its cost.

The same inherent qualities that make Stainless Steel so effective in these applications have equal money-saving possibilities in paper mill equipment.

For example, Stainless Steel already extensively used for wire cloths in cylinder moulds, washers and save-alls, has extended life from a matter of weeks to years.

In sulphite digesters, vacuum stills, heat exchangers, and in pipes and fittings handling hot sulphite liquor, the greater resistance to corrosion obtainable by the *right* Stainless Steel should also pay off big by extending life, reducing maintenance and wear.

Jordan bars, beater bars and bed plates made of Stainless Steel, which combines high strength and toughness with resistance to the reagents present, should certainly last longer and would insure elimination of staining and discoloration hazards.

Machine hoods made of light sheets of non-rusting Stainless Steel—which because it has much lower heat conductivity than ordinary steel, is less liable to sweat—should reduce paper loss due to discoloration and drip. Stainless Steel's superior resistance to fatigue, wear and abrasion would seem to fit it perfectly for increased use in flat and rotary screen plates. But why go on?

An Invitation to Explore

To help you explore the possibilities of Stainless Steel applications in your equipment, the cooperation of our engineers is freely at your service. We invite you to discuss with them the improvements which you believe might be achieved with Stainless Steel. These men know what Stainless Steel has accomplished and what it can do. They are quite familiar with paper mill problems. You'll find their suggestions eminently practical.

U·S·S STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS · PIPE · TUBES · WIRE · SPECIAL SECTIONS

AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago and New York*
CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
NATIONAL TUBE COMPANY, *Pittsburgh*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*

United States Steel Supply Company, Chicago, *Warehouse Distributors* · United States Steel Export Company, New York

UNITED STATES STEEL

Worthy Paper Plant Is Sold

SPRINGFIELD, Mass., February 15, 1946—The Worthy Paper Company of North Agawam, one of the oldest of Western Massachusetts industries and for many generations owned by the Bliss family, has been taken over by the National Printing Company of Thompsonville, Ct., through purchase of a controlling interest which includes all of the common (voting) stock ever issued by the Worthy company, as well as 60 per cent of the preferred stock which is non-voting. This confirms a forecast made recently by the PAPER TRADE JOURNAL. Officers of National Printing, which also has plants in Springfield, Mass., and Rockville, Conn., are George R. Ronaldson, president; John R. Gerich, treasurer, and Mrs. Rita C. Ronaldson, secretary.

Mr. Ronaldson said that the purchase resulted from the high regard in which his company held the fine papers made by the Worthy company, particularly the special papers which National Printing has for some years used in its art department in New York where greeting cards are manufactured, a paper product which Ronaldson said is the nearest to handmade paper that he knows of. He said that the same lines long manufactured by Worthy will be continued, as will also the same employes, and that expansion is contemplated.

Douglas W. Ronaldson, son of the National president, who was recently discharged from the navy where he served as lieutenant, senior grade, will be manager of Worthy, a position which was held for many years, along with the presidency, by Gorham Bliss.

The employes of the mill, in an NLRB election last fall, voted by a margin of one, that the AFL papermakers union should be bargaining agent, whereupon Bliss immediately announced that the mill either would be sold or closed. He asserted that he was not opposed to unionism but that the work of his plant in making high-class paper would not proceed successfully under a union. Ronaldson said he had no objection to the union.

Will Seek Competition in Money Paper

SPRINGFIELD, Mass., February 15, 1946—Special dispatches from Washington to this city report that the House appropriations committee, overriding suggestions from both the Budget Bureau and the Treasury Department, maintained in the annual Treasury money bill the proviso intended to secure more competition in production of distinctive paper for United States paper money and securities.

For eight years the entire contract has been held by Crane and Company of Dalton. Before that there were a couple of years when the Collins Company of Holyoke and North Wilbraham bid for a minor share of the contract. Generally speaking Crane has had the contract for almost 60 years.

The proviso the House committee insisted on retaining gives the Secretary of the Treasury authority to split the award for currency paper between the two low bidders. Without this proviso the total contract would have to go to the lowest bidder.

Keyes Fibre Earns $238,774

The Keyes Fibre Company for 1945 reports a net income of $238,774, against 1944 earnings of $289,246.

Issues New Writing Paper Differentials

WASHINGTON, D. C., February 18, 1946—Manufacturers' ceiling prices for writing paper have been reestablished on a new basis to provide greater financial incentive to manufacturers to perform sheeting operations on those papers normally sold in sheets, the Office of Price Administration announced today, in Amendment 9 to MPR450.

This action, effective February 23, 1946, is identical to that recently taken on book papers, where a growing tendency by manufacturers to sell paper in rolls was also forcing customers to go outside converters to get their paper finished in sheets.

The action, while permitting manufacturers to charge more for sheets on those types of paper customarily sold by the industry in sheets, restricts the increases to the point where total costs to the customer are less than when the paper is bought originally in rolls and the sheeting operations are performed by converters, OPA said.

At the same time, on the paper customarily sold in sheets, the ceilings for sales in rolls have been reduced, thus making it further profitable for manufacturers to sell this type of paper in sheets. Grades normally sold and priced on a jumbo roll basis are not changed.

The new ceilings are in dollar-and-cent on a jumbo roll basis, with specific differentials, applicable to the entire industry, for finishing and packing the paper in sheets. The action does not cover writing papers weighing less than 11 pounds for 500 sheets measuring 17 by 22 inches. The sheeting differentials are in line with recommendations of the Industry Advisory Committee for Writing and Book Papers.

Prices of writing papers to the public are not affected by this action, as retail ceilings on these papers remain unchanged.

Kraft Wrapping Paper Prices Up

WASHINGTON, D. C., February 18, 1946—Manufacturers' ceiling prices for kraft wrapping paper in sheets and counter rolls have been generally increased 25 cents a hundred pounds, the Office of Price Administration announced today.

This action, effective February 19, 1946, is designed to encourage a greater production of kraft wrapping paper in sheets and counter rolls by original manufacturers.

Manufacturers have been showing a progressive tendency to produce the paper in jumbo rolls, and buyers requiring this paper in sheets or small rolls have been required to pay outside converters to sheet and slit the large rolls.

Today's action is expected to result in an overall saving to retail stores and other consumers of this wrapping paper, as the new ceilings for original manufacturers are below those already applicable to converters.

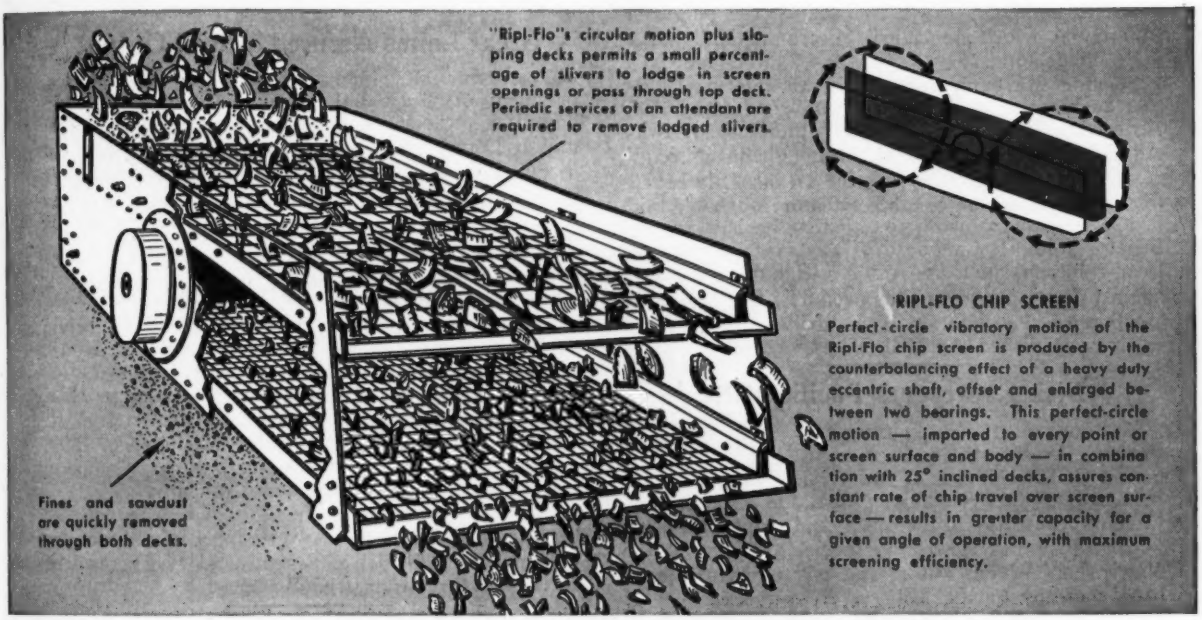
This is Amendment 13 to Maximum Price Regulation 182—Kraft wrapping papers and certain bag papers and certain bags.

Scholarship Offered

Anglo-Canadian Pulp and Paper Mills Limited, of Quebec, has offered a $500 scholarship for any student of Laval University, in Quebec, who wants to complete advanced studies in English this year. The scholarship will be awarded following a special contest.

Shall I Buy?"

2 Distinct Types of Chip Screens A-C Builds, form Size Chips—thus Meets a Different Need!


"Ripl-Flo"s circular motion plus sloping decks permits a small percentage of slivers to lodge in screen openings or pass through top deck. Periodic services of an attendant are required to remove lodged slivers.
Fines and sawdust are quickly removed through both decks.

RIPL-FLO CHIP SCREEN

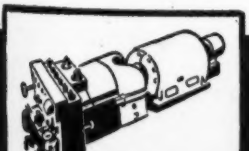
Perfect-circle vibratory motion of the Ripl-Flo chip screen is produced by the counterbalancing effect of a heavy duty eccentric shaft, offset and enlarged between two bearings. This perfect-circle motion — imparted to every point or screen surface and body — in combination with 25° inclined decks, assures constant rate of chip travel over screen surface — results in greater capacity for a given angle of operation, with maximum screening efficiency.

NEED JUST AVERAGE SCREENING EFFICIENCY? A-C's "Ripl-Flo" chip screen (above) will give you an *average percentage* of uniform size chips. Its motion—like that of *any* inclined screen—permits a limited number of slivers to turn on edge and lodge in screen openings. These slivers require periodic removal. For many grades of pulp, however, "Ripl-Flo" proves entirely satisfactory. One reason . . .

"RIPL-FLO" SCREEN DOES AS GOOD or *better* screening job than any inclined screen! It is a low-price screen—uses only 2 bearings in its design. Saves on power—lowers maintenance over conventional 4-bearing screens.

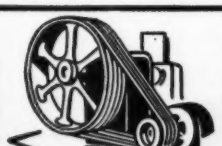
For more information on A-C chip screens, plus screening "Questionnaire", call our nearby district office, or write for Bulletin B6353. ALLIS-CHALMERS, MILWAUKEE. A1903

HEAR THE BOSTON SYMPHONY: *Saturday, American Broadcasting Co.*

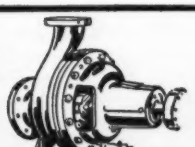


POWER — all types of Power Generation, Distribution and Control Equipment.

MOTORS & CONTROLS — all types a-c and d-c Motors, ½ to 7000 hp — Gearmotors.



TEXROPE V-BELT DRIVES — fractional to 5000 hp — Constant and Adjustable speed.



PUMPS — Single & Multi-Stage, 10 to 150,000 gpm — Paper Stock Pumps, Fan Pumps.

MILWAUKEE 1, WIS.

South to Seek Higher Pulp Price

SPARTANBURG, S. C., February 15, 1946—Southern Senators and Congressmen fighting the recent OPA order which fixed the northern rate 70 per cent higher than that for the South, predict an immediate increase of about $1.40 per cord unit in the ceiling price of southern pulpwood.

According to a special dispatch to the Charlotte Observer from its Washington correspondent, Senators Clyde R. Hoey of North Carolina and Burnet R. Maybank of South Carolina, and Representative John J. Riley of the Second South Carolina District, are members of a special committee which recently obtained a higher ceiling for southern pine lumber and now is seeking more for pulpwood.

Senator Olin D. Johnston of South Carolina protested to the OPA (Feb. 13) against the pulpwood differential which he called "discrimination" harmful to the South.

Senator Maybank declared in an interview here that an increase in the cost of pulpwood from $1.20 per cord to $1.40, as announced by the Office of Price Administration February 14, "is totally insufficient."

"The 20-cent increase in price means little benefit to the people of the South," Senator Maybank said.

The Senator went on to say that he had advised Senator John H. Bankhead of Alabama, in response to a communication regarding OPA discrimination against the South in lumber products, that "the only solution of the situation is to abolish the OPA as we have abolished the FEPC."

Fisk Represents Pacific Mills

VANCOUVER, B. C., February 17, 1946—Paul E. Cooper, President of Pacific Mills Limited, has named G. Harold Fisk of Montreal as eastern representative of the company. Since the inception of wartime controls in the pulp and paper industry Harold Fisk has served as special assistant to the Newsprint Administrator and arrangements have been made by Pacific Mills whereby the services of Mr. Fisk would continue to be at the disposal of the Newsprint Administrator to whatever extent required.

As recently announced, Harold Fisk will also serve Powell River Company Limited of Vancouver as their eastern representative.

CSPTA Elects Page

COLUMBUS, Ohio, February 15, 1946—The Central States Paper Trade Association held its annual meeting and election of officers at Columbus, Ohio, on Tuesday, January 29th. Jerome F. Page, vice-president of the Central Ohio Paper Company, Columbus was elected president; E. F. Petrequin, secretary of the Petrequin Paper Company, Cleveland, was elected vice-president and John L. Richey, Cincinnati was elected secretary-treasurer and counsel. Retiring president George S. Clarke of the Central Michigan Paper Company, Grand Rapids, was elected to represent the association on the fine paper board of directors of the National Paper Trade Association.

Eastern Corp. Profits Off

The Eastern Corporation for 1945 reports a net profit of $466,021, equal to $1.37 a common share, against $560,459, or $1.63 a common share, the year before. Net working capital increased $252,918 to $3,555,543 on December 31, 1945.

Gair-Santee Now Southern Paperboard

SAVANNAH, Ga., February 16, 1946—The name of the Gair-Santee Corporation, subsidiary of the Robert Gair Company, Inc., which plans to erect a $12,000,000 kraft and paper plant at Savannah, has been changed to the Southern Paperboard Corporation.

Informed sources here said it was understood the change was made because the name Gair-Santee connoted a South Carolina operation. Originally the big paper manufacturing concern planned to locate on the Santee river in South Carolina.

As noted, Southern Paperboard Corporation is incorporated in the State of Delaware and domesticated in Georgia. The petition for change in name was filed with the Secretary of State for Georgia and in Ware county it was stated.

Great Lakes Assured of Full Output

TORONTO, Ont., February 16, 1946—Earl Rowe, president of Great Lakes Paper Company has reported that capacity operation of the big newsprint mill at Fort William was assured for 1946. The cut of pulpwood this winter has been considerably better than last, and hauling conditions in the bush are now excellent, and will greatly facilitate movement of the timber cut to the mill.

Samuel R. Parry Dead

Samuel R. Parry, industrialist and leader in civic affairs, died in St. Mary's Hospital, Rochester, N. Y., February 13, after an illness of several months.

Born in Rochester eighty-three years ago, Mr. Parry, at his death, was owner of the Samuel R. Parry Machine Company, which he founded in 1899. He also was president of Genesee Feldspar Company and Rochester Paper Products Company.

Mr. Parry was a past president of the Automobile Club and the Rochester Advertising Club, a founder of the Better Business Bureau and vice president of the old First Industrial Bank.

Howard Trumblower

BUENA VISTA, Va., February 19, 1946—Howard T. Trumblower, president of the Columbian Paper Company, with offices in Buena Vista and Bristol, died Sunday at his home here. He was 76 years old. A native of Quakertown, Pa., Mr. Trumblower was the son of the late Dr. and Mrs. Lewis Trumblower. He was educated in the public schools at Norristown, Pa., and attended a business college in Philadelphia.

Funeral services were held at 2 P.M. Monday at the residence here. The body was taken to Norristown, Pa., where a second funeral service was held at 11 A.M. Wednesday at Bailey-Browne Funeral Home, with burial following in Riverside Cemetery there. The deceased is survived by his widow and one sister, Mrs. J. Q. Thomas, of Conshohocken, Pa.

Harry W. Glenn

Harry W. Glenn, beater engineer for the Crown Willamette Div., Crown Zellerbach Corporation, Camas, Wash., died on January 16, 1946. Mr. Glenn was born in Millbank, South Dakota on August 14, 1887 and graduated as a chemical engineer from the University of Minnesota in 1924. He was formerly chemist and beater engineer from the Northwest Paper Company, Cloquet, Minn., and was a member of the Technical Association of the Pulp and Paper Industry.

CHEMICALS

VETERANS OF WORLD WAR II:
To help you in purchasing surplus property from War Assets Corporation, a veterans' unit has been established in each of our Regional Offices*.

GOVERNMENT-OWNED SURPLUS NOW!

The chemicals shown here are surplus war material. They are available now at quick sale prices to meet civilian production needs. As with hundreds of other similar surplus chemicals they may be obtained by writing, wiring, or phoning your nearest War Assets Corporation office*. Make it *your* habit to check this source whenever your stock needs replenishing.

**In directories simply look up Reconstruction Finance Corporation. War Assets Corporation is an R.F.C. subsidiary.*

HYPOCHLORITE BLEACH—one year old material; manufactured with 30% available chlorine; grade 3; available as follows for 1¼ cents per pound in carload lots; (F.O.B. location).

Birmingham — 305,600 lbs. in 400 lb. drums. Also one carload of grade 2, packed in 100 lb. drums.

Salt Lake City—8,785,572 lbs. in 43 and 50 lb. steel drums.

40% CHLORINATED PARAFFIN for fire proof, water proof and mildew proof coatings. Approximately 9 million pounds available for 2 cents per pound in car load lots or total amount at a single location, F.O.B. location as follows:

Boston, Cleveland, Detroit, Philadelphia, Richmond and Salt Lake City

MIXED XYLIDINES; 7 cents per pound, carload lots, F.O.B. location.

POTASSIUM SULPHATE available for 10 cents per pound, F.O.B. location as follows:

Minneapolis: 93,075 lbs. in 400 lb. (app.) wooden barrels.
Chicago: 53,355 lbs. in 35 lb. fiber drums.

CHECK AND MAIL TODAY

To War Assets Corporation:

Without obligation, please send me further information on the following products and place my name on your regular mailing list:

- ☐ Glacial Acetic Acid, C.P. in one gal. bottles.
- ☐ Copper Napthenate, 8% solution in drums.
- ☐ Sodium Sulphite
- ☐ Manganous Chloride
- ☐ Smokeless Powder
- ☐ D.N.T. (Dinitrotoluol)
- ☐ Silica Gel: in various small size fabric bags weighing from 15 grams to 10 lbs. each.
- ☐ Khaki Dyes (basic colors)

Firm.....

Street.....

City.....State.....

155-2

PAINTS

OIL TYPE, READY MIXED PAINT—SPEC. T-1215

Ready for use. This paint, containing linseed oil, may be brushed or sprayed to produce a flat finish which dries in a few hours. It is well suited to both interior and exterior walls wherever a medium grade low cost paint is permissible. It may be applied to wood, brick, masonry or concrete.

FOR INDUSTRIAL USES

Warehouses — Housing
Office Buildings — Fencing
Shops & Garages — Factories

COLORS

Light Green — Olive Drab
Dark Green — Loam
Field Drab — Earth Red
Earth Yellow — Haze Gray
Earth Brown — Black
Sand — White

For detailed information contact any of the War Assets Corporation Regional Offices below:
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155-3

FINANCIAL NEWS

New York Stock Exchange

High, Low and Last for Week Ending February 16, 1946

STOCKS

	High	Low	Last
A. P. W.	10⅛	9¼	9¾
Armstrong Cork Co.	58	56	58
Celotex Corp.	29	25⅛	28⅞
Celotex Corp., pf.	21¾	21⅛	21¾
Certain-Teed Products Corp.	20⅛	17⅝	20
Certain-Teed Products Corp., pf.	109½	109½	109½
Champion Paper & Fibre Co.	50	49¾	50
Champion Paper & Fibre Co., pf.	113	113	113
Congoleum Nairn Co.	36	34½	36
Container Corp. of America	44⅞	42¾	44⅞
Continental-Diamond Fibre Co.	18	16¾	17½
Crown-Zellerbach Co.	35	33	34⅞
Crown-Zellerbach Co., pf.	109⅛	108⅝	109¼
Dixie Cup Co.	45	43	44½
Dixie Cup Co.—A	55¾	52½	54
Flintkote Co.	41⅜	39	41⅛
Flintkote Co., pf.	114	114	114
Robert Gair	11¾	9⅜	10⅝
Robert Gair, pf.	20⅝	20	20⅛
International Paper Co.	45⅞	42½	45½
International Paper Co., pf.	120¾	112½	114¾
Johns-Manville Corp.	154	147¾	153½
Johns-Manville Corp., pf.	140	135	140
Kimberly-Clark Corp.	64	61⅛	64
Mac Andrews & Forbes	38½	38½	38½
Mac Andrews & Forbes, pf.	...	...	...
Masonite Corp.	62	60¼	61¾
Mead Corp.	23¾	21⅜	23¾
Mead Corp., pf. A—6%	...	...	...
Mead Corp., pf. B—5½%	105½	104¼	104¼
National Container Corp.	28¼	26⅞	28
Paraffine Companies, Inc.	81½	80	81
Paraffine Companies, Inc., pf.	...	...	...
Rayonier, Inc.	27⅛	25⅜	27
Rayonier, Inc., pf.	38½	38	38
Ruberoid Co.	49¾	48½	49¾
Scott Paper Co.	58	57	58
Scott Paper Co., pf.	107½	107½	107½
Sutherland Paper Co.	40⅜	39	40⅜
Union Bag & Paper Corp.	27¼	24¼	27
United Paperboard Co.	12½	11⅞	12½
U. S. Gypsum Co.	120	114	120
U. S. Gypsum Co., pf.	...	...	...
West Virginia Pulp & Paper Co.	42½	40½	42½
West Virginia Pulp & Paper Co., pf.	114¼	114	114

BONDS

Abitibi Pulp & Paper Co. 5s '53	108	107½	107¾
Celotex Corp. 3¾s '55	...	...	...
Certain-Teed Products Corp. 5½s '53	...	...	...
Champion Paper & Fibre Co. 3s '65	105	105	105
International Paper Co. 6s '55	108	108	108
International Paper Co. 5s '47	105½	103⅝	105½
Mead Corp. 3½s '53	...	...	...

New York Curb Exchange

High, Low and Last for Week Ending February 16, 1946

STOCKS

	High	Low	Last
Great Northern Paper Co.	43	41¾	42½
Hummel-Ross Fibre Corp.	13¼	12¾	13¼
St. Regis Paper Co.	11½	11	11⅜
St. Regis Paper Co., pf.	...	...	...
Taggart Corp.	10	9½	10

BONDS

American Writing Paper Co. 6s '61	103	103	103

Union Bag Issues Report

Continuing the successive increases shown each year for the past decade, net sales of the Union Bag and Paper Corporation in 1945 advanced to a new high of $41,391,116, Alexander Calder, president, stated in the preliminary annual report released today. This was an increase of 6 per cent over 1944 and three and one-half times the company's net sales in 1936, the year in which the Savannah plant began operations. Total tonnage of all products sold last year was 321,090 tons, against 304,996 tons in 1944.

Net income, subject to audit, aggregated $1,646,467 after providing for nearly $2,000,000 more of special amortization than was charted in the previous year. This is equal to $1.30 a share and compares with $1,584,013, or $1.25 a share, for 1944.

Mr. Calder said the company closed last year with a strong working capital position, the figure being $7,300,513, of which cash alone exceeded all current liabilities. Working capital at the end of 1944 was $6,943,222.

FTC Complains Against Zellerbach

WASHINGTON, D. C., February 20, 1946—Crown Zellerbach Corporation, San Francisco, and its wholly owned subsidiaries, Zellerbach Paper Company, San Francisco, and General Paper Company, Los Angeles, are charged in a complaint issued by the Federal Trade Commission with violating the Robinson-Patman Act by knowingly inducing and receiving price discriminations from sellers of paper and paper products. The respondent corporations are said to constitute the largest and most extensive distributors of paper and paper products in the West and, as a consequence, are an essential outlet to sellers of such commodities.

The complaint alleges that manufacturers, jobbers and distributors are induced by the respondents to discriminate in prices between different purchasers of paper and paper products of like grade and quality by allowing the respondents special discounts and commissions which are not granted to their competitors. According to the complaint, the respondents receive information as to prices paid by their competitors and refuse to purchase from the sellers unless they are granted lower prices than those paid by such competitors.

The respondents' practices, the complaint alleges, constitute a violation of section 2 (f) of the Robinson-Patman Act, and the effect of the price discriminations, as alleged, may be substantially to lessen competition and to tend to create a monopoly in the respondents, and to injure, destroy or prevent competition between the respondents and their competitons and among the sellers from whom the respondents purchase.

Twenty days were granted the respondents in which to answer the complaint.

International to Retire Ten Millions

NEW YORK, N. Y., February 14, 1946—Directors of International Paper Company declared the regular quarterly preferred dividend of $1.25 a share payable March 30 to holders of record March 11. In addition a quarterly common dividend of 50 cents a share was declared payable March 30 to holders of record March 8.

The directors also voted to call $10,000,000 par value of Cumulative Convertible 5% Preferred Stock for redemption April 4, 1946 at 105 and accrued dividend. Shares to be redeemed will be selected by lot from list of record at the close of business February 25, 1946.

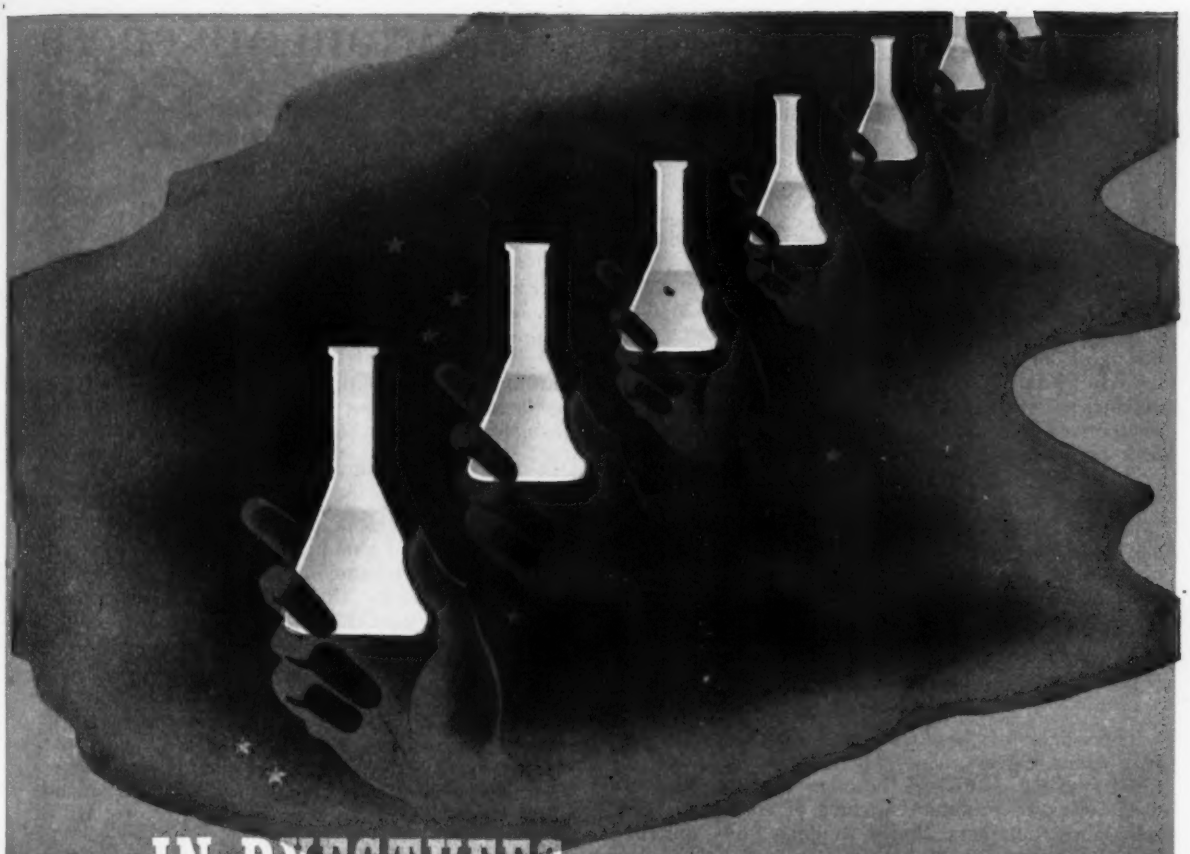
Each share of preferred stock is presently convertible into 2½ shares of common. Preferred shares called for redemption may be converted into common stock until the redemption date.

A. P. W. Products Nets 14 Cents

The A. P. W. Products Company, Inc. for the twenty-six weeks to December 31, reports a net profit of $26,082, equal to 14 cents each on 192,004 common shares, compared with $60,218 or 38 cents each on 160,266 shares in the 28 weeks to Jan. 13, 1945; net sales, $2,203,960 against $2,591,470.

Consolidated Paper Nets $1.23

The Consolidated Paper Company for 1945 reports a net income of $920,612, or $1.23 each on 750,000 shares, compared with $1,072,101, or $1.43 a share in 1944.



IN DYESTUFFS
MONOTONY BECOMES A VIRTUE

In the manufacture of a Du Pont dye, repetition, even to the point of monotony, becomes a virtue. For Du Pont chemists insist that each lot be exactly like its predecessor.

This involves constant analysis of ingredients, rigid control of manufacturing processes and testing of the finished product each time that dye is produced.

The resulting high standard of uniformity justifies the extra effort. Dyers know they can depend on Du Pont dyes to give dependable performance at all times. E. I. du Pont de Nemours & Co. (Inc.), Dyestuffs Division, Wilmington, Delaware.

Du Pont Dyestuffs

DU PONT DYESTUFFS

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

LISTEN TO *"Cavalcade of America" every Monday Evening—NBC*

Chemical Show Exhibits Important Advances

Twentieth Exposition of Chemical Industries To Be Held At Grand Central Palace, February 25 - March 2 — Wartime Developments Include New Materials—Material Handling Equipment Featured.

The twentieth Exposition of Chemical Industries will open at the Grand Central Palace, New York, February 25 to March 2. The exhibits number more than 350 and are arranged on four floors. On display are many examples of new and rare substances, through a long list required for testing and materials used in chemical processing in the paper and other industries. One wartime development was the use of microcrystalline waxes which have wide peacetime uses in paper making and packaging. Filtering, grinding and mixing appliances, cooling and drying equipment, testing equipment and many important exhibits of pumps, valves, meters, etc. are on display. The exposition includes a good representation of material handling equipment, from piping and other liquid handling equipment to conveyors, trucks, lifts and hoists. The following exhibits of leading concerns are of particular interest to the paper industry:

Acme Steel Co.

The exhibit of the Acme Steel Company includes two Acme Silverstitch Stapling Machines; one a tilted frame bag stitcher, the other a bottom stitcher used for positive bottom stitching of corrugated and solid fibre containers, slotted shipping units and collapsible boxes.

These machines are used in demonstrations throughout the show. There is a model strapping table also, where the Acme Steelstrapping method is demonstrated. The back drop displays panels showing photographs of the various "packaging and shipping" aids manufactured by the company.

A scale model of a freight car shows the Acme method of "car door bracing."

Representatives in attendance include D. M. Eck, V. G. Fiorie, R. H. Rosenberg and M. P. Clark. Mr. Homer H. Clark and vice president in charge of the New York division.

Allegheny Ludlum Steel Corp.

The exhibit of the Allegheny Ludlum Steel Corporation features interesting illustrations of the use of tool, stainless, electrical steels and Carmet. In addition, an operating miniature model diorama depicts the melting of steel electrical.

There are samples of stainless, tool, electrical steels and Carmet on display along with full technical literature.

Alloy Steel Products Co.

The Alloy Steel Products Company exhibits stainless steel valves exclusively. The display includes valves designed especially for use in the chemical, petroleum refining, paper and other process industries where corosion or product contamination create important maintenance problems.

Background of the booth features a series of large scale photographs, lighted indirectly, showing ALOYCO valves in actual service. Processes to be pictured are fine chemical and pharmaceutical manufacturing, oil refining, sulfuric acid handling, synthetics and paper production.

Representatives of the company in attendance at the booth are John H. Davis, Jr., president, A. P. Nelson, plant manager, R. M. Davis, sales manager, R. E. Boller, Jr., sales engineer, W. E. Cavanagh, metallurgist, Harry Dence, chief design engineer, R. M. Barrett, purchasing agent, Leslie E. Cowell, office manager and Arthur Stout, advertising manager.

Aluminum Co. of America

The exhibit of the Aluminum Company of America will provide a comprehensive view of the part aluminum and aluminum compounds play in the chemical and petroleum industries. On exhibit were all forms of metallic aluminum and its alloys, such as sheet, plate, wire, rod, bar, rolled shapes, tubing, pipe, rivets, forgings, castings, foil, caps, seals and powder.

The following representatives of the company will be present: R. M. Beck, R. C. Bradbury, C. D. Brown, R. H. Brown, W. R. Bushnell, A. C. Cooper, F. W. Conrade, M. W. Daugherty, R. V. Davies, W. O. Gairns, R. E. Hamilton, N. J. Hammond, S. H. Knowlton, R. A. Keenan, E. G. Kort, M. R. Kambaugh, H. P. Bonebrake, F. G. Lancaster, F. R. Marshall, H. C. McArt, R. F. Miller, A. R. Pickett, E. M. Strauss, Jr., Dr. P. T. Stroup, R. L. Schmidt, J. B. West, A. H. Woollen, C. A. Yeaton, C. B. Fox, J. R. Eckley, R. B. Whidden, R. B. Derr, L. A. Mapes and R. L. Hoy.

Ansul Chemical Co.

The Ansul Chemical Company features two main products: Liquid Sulfur Dioxide and Liquid Methyl Chloride. An actual display on the use of Ansul sulfur dioxide for sulfite fortification and kraft bleach acidulation is an added attraction.

Personnel attending the exposition are C. V. Mars, Sales Manager, Industrial Chemicals Department, William R. Rinelli, New Products Division, A. O. Wingender and R. J. Yaeger, Industrial Sales and R. E. Thompson, Eastern Industrial Sales.

Barco Mfg. Co.

The exhibit of the Barco Manufacturing Company features a working model of the new Barco Revolving Joint and Adjustable Ball Flange. This unit demonstrates how it is made possible to line up rolls that are tapped eccentric, eliminating wear in the rotating sleeve and making the Barco Joint very low in turning torque. This materially reduces the cost of power consumption.

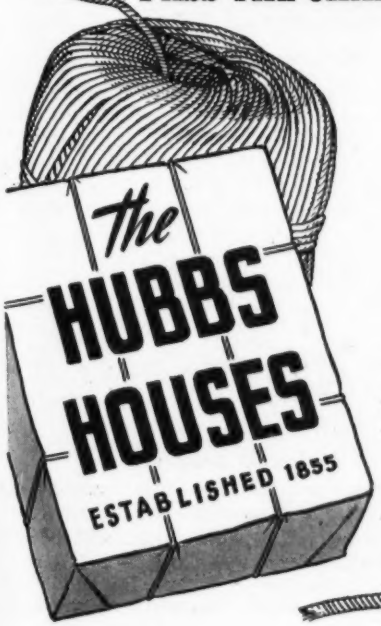
A demonstrating model of a Barco Joint, showing how their joints eliminate breakage of tubing and piping due to vibration is also on display.

A model of a hydraulic cylinder showing the Barco Joint application on the pivot point of cylinders installed without any piping strains is also exhibited.

Representatives present include H. S. Kuhn, R. D. Guy, J. H. Lean and F. O. Nixon.

"EVER SINCE SMILEY TOOK ON HUBBS HOUSES TO SELL HIS LINE, HE'S A WINNER IN EVERYTHING. WATCH HIM PASS THE CHAMP NOW!"

Is every week in the year a "6 day race" to keep your line in the running where business is consistently good . . . from Indiana east? If you are not getting your share in America's No. 1 Market, perhaps it is time you learned how we can help you expand sales and distribution at moderate cost.



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HUBBS & HASTINGS PAPER CO.
SYRACUSE 2, N. Y

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HALIFAX

GARDEN CITY PAPER MILLS CO., LTD.
ST. CATHARINES, ONT.

CANADIAN VEGETABLE PARCHMENT CO., LTD.
MERRITTON, ONT.

WAREHOUSES AT ALL THE ABOVE

The Container Co.

The Container Company, Division of Continental Can Company, exhibits a complete line of Fiber Shipping Drums and small Paper Containers with special linings and treatments for shipping and storing chemicals, pharmaceuticals and allied products.

Representatives in attendance are: C. E. Eggerss, H. M. Walter, D. C. Eldredge, D. S. Thompson, J. V. Reinhart, C. B. Pearsall, D. F. Burrill and L. A. Dockstader.

Hardinge Co.

The Hardinge Company will exhibit two new products, the Automatic Backwash Rapid Sand Filter and the BLM "Auto-Centri" Clutch. These will be in addition to the regular Hardinge line which includes mills, Ruggles-Coles dryers, classifiers, thickeners, and clarifiers, for the chemical industry.

The Automatic Backwash Rapid Sand Filter will be illustrated by two cross-sectional drawings exhibited by transparencies in the central part of the exhibit. This product is being used in paper mills for the treatment of raw water supply, as well as handling waste water or excess white water.

A working model of the BLM "Auto-Centri" Clutch will be one of the features of the exhibit. The clutch will be installed on a motor and a driven load. Tachometers will register the motor and driven load speeds and graphically show how the clutch brings the load up to speed after the motor has reached its full operating speed. This clutch is just being introduced to the market, and additional information on it may be secured from the Hardinge Company.

The following Hardinge sales engineers were present: M. C. Fleming, F. Schad, G. F. Metz, J. K. Towers, W. H. Withington, E. B. Doelp, and R. J. Russell.

Hercules Powder Company

The exhibit of the Hercules Powder Company will display representative chemicals supplied to industry by five of the company's departments—Cellulose Products, Paper Makers Chemicals, Virginia Cellulose, Naval Stores, and Synthetics.

The 24 products will be displayed on eight turntables, each of which is divided into three sections. These products are used in a variety including plastics, paper, paint and varnish, ink, textile, rubber, etc.

Technical representatives from the five departments exhibiting products will be at the exhibit throughout the Exposition.

Johns-Manville

The Johns-Manville exhibit features products for the Chemical Industry manufactured by the company from the basic raw materials—asbestos and diatomaceous silica.

From asbestos come many of the products in the Johns-Manville line of Industrial Insulations. In addition, it plays an important part in J-M Packings, Transite Pipe and Industrial Building Materials.

The Celite line of filter aids and Mineral Fillers is manufactured from Diatomaceous Silica, mined from the world's largest source of this material at Lompoc, Calif.

Representatives of the company include the following: A. S. Elsenbast, W. D. Van Arnam, F. L. Horine, C. J. O'Neil, W. S. Hough, E. D. Flavin and C. C. Simoni.

Jeffrey Mfg. Co.

The Jeffrey Manufacturing Company features section of Type H drying and cooling equipment, high speed Pulverizer and small vibrating feeder, control board illustrating a crusher control which will indicate automatic feeding of a crusher, style "F" Rotary Bin Valve, Jeffrey-Traylor Waytrol (automatic weighting device), Low Head barrel packer, electric vibrating feeder and Hopper equipped with leveltrols.

Representatives in attendance include H. J. Flint, Jared Smith, L. W. Stevens, A. T. Cecil, E. S. Fador, of the Jeffrey-Traylor Division; L. A. Rhodes of the Reduction Division, and Paul Lawall, district manager, New York.

Kinney Mfg. Co.

The Kinney Manufacturing Company shows in operation one of their compound dry vacuum pumps capable of producing a final vacuum of from .1 to .2 microns on a McLeod gauge reading. In addition, they exhibit a single stage dry vacuum pump capable of final readings of 10 microns or better; a steam heated separator tank; four sizes of vacuum tight valves; an acid sludge pump; a dry disc clutch; together with recording type Pirani gauges, McLeod gauge, and literature on its complete line of pumps.

In attendance are William E. Worcester, vice president in charge of sales; H. I. Stoltz, chief engineer, Boston; E. F. Bender, manager New York office, R. C. Webster, assistant manager, New York; A. J. Munday, Chicago manager and H. G. Saunders, Philadelphia manager.

Nash Engineering Co.

The Nash Engineering Company will feature Nash Compressors and Vacuum Pumps, also Nash pumps of "Pyrex" brand glass.

Present in the booth will be Irving C. Jennings, president; Edward A. Mead, sales manager; W. M. Thomson, manager of industrial sales; G. B. Wright, publicity manager; J. B. Wright, W. W. Hickey, C. J. Lyons, A. W. Winship, Stuart Lyon, F. W. Green, E. A. Barton, sales engineers. Numerous sales representatives will be present also, including Carl Clark and Carlo Vicario, well known to the paper industry.

National Lead Co.

The National Lead Company booth will carry the slogan "Make Acid Toe the Line—Go 'National' for Lead". Prominently displayed will be large storage battery case intricately cast in solid lead; a striking contrast in solid lead valves from one less than a foot high to a 12-inch valve standing five feet and weighing 1500 pounds; also a new type of valve with split body and removable seat and plug which makes it versatile, adaptable and economical. In addition there will be a representative showing of pipe, fittings, coils, tanks, sheet and other lead products widely used in acid handling.

Representatives at the booth will include H. J. Irvin, C. W. Gesregan, J. H. Sabo, G. H. Checkley, C. Stauff and J. A. O'Hare.

National Technical Laboratories

The National Technical Laboratories' exhibit will show all types of Beckman instruments. Of particular interest to the pulp and paper industry will be the Model G portable pH Meters and the Model R continuous Automatic pH Meter for use in Industrial recording and control of pH. A variety of electrode

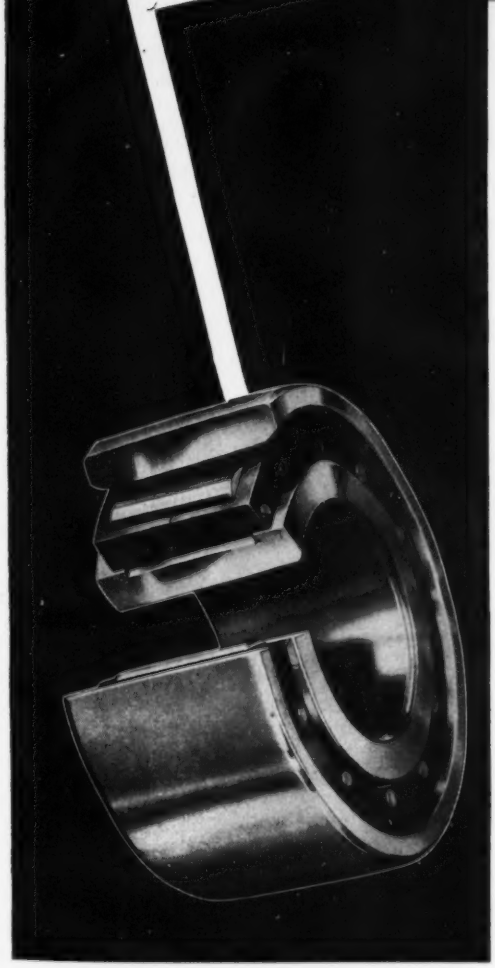
Cut down on

MAINTENANCE Shut-downs

WITH

ROLLWAY

RIGHT-ANGLE LOADING



Now—when you are sweating out production to catch up with peacetime demand—when every shut-down means lost marketing opportunity as well as costly labor and machines standing idle—give Rollway *right-angle loading* a chance to prove what it can do for you in the way of preventive maintenance.

Rollway Right-Angle Roller Bearings will help your machines to run longer under heavier loads . . . with lower maintenance cost . . . and low bearing-replacement costs. That's because Rollway *right-angle loading* splits all compound loads into the two simple components of pure radial and pure thrust . . . carries each of these components on a separate bearing assembly at *right angles to the roller axis*. It reduces the unit loading on rollers and bearings. Insures lower starting and running torque. Eliminates all resultants from oblique loads, all piling up of thrust and radial loads on the same bearings. That's why you get longer periods of precision operation, with fewer shut-downs for service or replacement.

● **Send us a print or detailed description of your bearing needs for free bearing analysis and recommendation. No charge. No obligation. S.A.E., and American Standard metric dimensions and tolerances are available for most applications, assuring quick supply and low replacement costs.**

ROLLWAY BEARING COMPANY, Inc.
Syracuse 2, N. Y.

ROLLWAY CYLINDRICAL ROLLER BEARINGS

SALES OFFICES: Philadelphia • Boston • Pittsburgh • Youngstown • Cleveland • Detroit • Chicago • St. Paul • Houston • Tulsa • Los Angeles

Assemblies for all types of applications, including one for use in pulp and paper plants, will be displayed and demonstrated.

The Beckman spectrophotometers will also be in the exhibit. These instruments include the Model DU Quartz Spectrophotometer for use in the visible and ultraviolet wavelength region and the Model IR-2 Infrared Spectrophotometer and Model DUR Recording Quartz Spectrophotometer. The latter two instruments are adapted for automatic and continuous recording of plant stream compositions using light of any of the visible ultraviolet or infrared wavelength. These instruments will also be demonstrated.

The personnel present will include Dr. A. O. Beckman, president, T. F. Herring, vice president in charge of sales, and Dr. E. D. Haller and Mr. R. W. Moulton, sales engineers.

Oliver United Filters, Inc.

Oliver United Filters Inc. exhibits models of many of its extensive line of filters paying particular attention to the Oliver Panel, Oliver Precoat, and Oliver Horizontal Rotary Filters. Also on exhibition, the Olivite Acid Handling and O.D.S. Diaphragm Slurry Pumps. Enginners from the Chicago and New York offices are in attendance, including those specializing in continuous vacuum filters for handling pulp.

Representatives in attendance include the following: J. A. Kenney, D. F. Irvin, L. W. Knapp, J. E. King, George E. Shaw, Walter Riker, George A. Love, James C. Lowe, T. T. Meehan, Chas. Fuhrmeister, A. C. Barnebl, L. D. Thompson, R. Gordon Walker, C. W. Crumb, C. S. Robison, Jr., Wm. B. Gardella, Ward H. Pitkin, H. A. Morrison, and Bruce P. Ellen.

Paper & Industrial Appliances, Inc.

Paper and Industrial Appliances, Inc., exhibits a complete Brammer Recording Consistency Control. Other P&I products including the Chemipulper, Roll-O-Finer, and Rotabelt are shown in large illustrations.

The Permutit Co.

The exhibit of The Permutit Company features continuous demonstrations of the ion exchange process. A chart clearly explaining demineralizeration of water is displayed as well as several photos of Permutit demineralizing installations. A. B. Mindler, M. Gilwood, V. Calise, G. C. Banikiotes, E. Nordell, J. I. Munson, J. S. Shedden, attendants at the booth, explain not only ion exchange in the water conditioning field but also tell of its importance in the process industries.

Photovolt Corp.

The Photovolt Corporation exhibits their Photoelectric Reflection Meter for measuring brightness, opacity, color, and gloss of pulp, paper, and paper products.

Other exhibits include the LUMETRON Colorimeter Model 400-A which is suited, for instance, for color tests on sulphite liquor for the purpose of determination of cooking time. The same instrument is also suited for photoelectric pH determination as well as for all other colorimetric and turbidimetric tests carried out for the purpose of chemical analysis.

A new Colorimeter exhibited by Photovolt permits photoelectric measurements to be carried out in Nessler tubes. This instrument is especially designed for the analysis of water for industrial or municipal plants.

The following representatives are in attendance: Dr. B. A. Silard, V.P., S. E. Krewer, M. Lederer.

The Wm. Powell Co.

The Wm. Powell Company will exhibit a number of valves fairly representative of its complete line. These will be globe, angle, gate, check, Y, relief, flush bottom tank valves, cocks, liquid level gauges, etc. These valves will be shown made up in various metals such as bronze, iron, steel, stainless steel, nickel, Monel Metal, Inconel, Hastelloy Alloys and other metals and alloys listed on page three of the enclosed copy of our Corrosion Resistant Valve booklet. Included will be valves of interest to Paper Men—Valves designed and made especially for sulphate, sulphite and soda mills.

Representatives of the company expected to attend are: Wm. E. Heilig, vice president, Miss Ruth Brester, Maurice Bolinger, metallurgist, all from the Cincinnati home office; Oliver Gang, vice president, Howard Butt, New York office; Allen B. Stiles, Philadelphia; Peter A. Vacca, Buffalo; and Walter McNamara, Albany, N. Y.

St. Regis Paper Co.

The exhibit of the St. Regis Paper Company will feature the St. Regis packaging systems. Samples of some 250 commodities which are regularly packed in St. Regis multiwall bags will be mounted in glass tubes against a black background of St. Regis Panelyte plastic. In the center of the display, photographs will illustrate the St. Regis "Valve Pack," "Sewn Pack" and "Tied Pack" systems.

In addition, the background will carry enlarged photographs of the first in a new series of case history advertisements, one of which will be released each month in 1946. The case history to be displayed illustrates the use of our 100-LS packaging machine and the pictures will show the operation of this machine and the handling of filled bags. In addition, there will be at one end of the display one of these packers in actual operation, and because of wide spread interest in palletizing methods of handling bags, we will show an automatic lift truck and a unit load of bags on the other end.

St. Regis literature to be distributed at the exhibit will include the case history folder above referred to, the "Story of St. Regis Multiwall bags," and circulars descriptive of other St. Regis packaging machines, together with pamphlets on sewing equipment and wire ties.

Sarco Company

The Sarco Company, Inc., exhibits a complete line of steam traps, temperature regulators, strainers, and hot and cold water mixing valves; also new electric process controls.

The Sarco temperature regulators produce the operating force which closes the valve by simple liquid expansion, instead of volatile liquids dependent upon critical vaporizing temperatures.

Sprout, Waldron & Co.

Sprout, Waldron & Co. will feature the "36-2" improved model Disc Refiner, with peripheral control mechanism, designed to meet the special problems of pulp preparation. For contrast, a small Monarch laboratory grinder will be displayed.

The company will also have on display a "Junior" model Pellet Mill and a working model of Style "V" Vertical Mixer, 6 feet high.

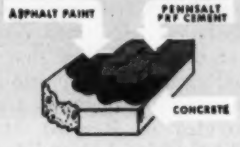
Other equipment will include two knife cutters,

A NEW AND SUPERIOR RESIN-TYPE CEMENT...

PENNSALT PRF CEMENT

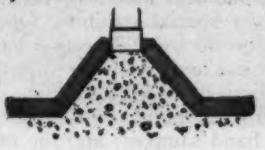
Designed specifically for bonding corrosion-proof brick and tile in uses where acids, alkalis and solvents are encountered

Typical applications are laying floors and drains, and lining tanks in metal finishing shops where a special cement is required that will resist corrosive acids, alkalis and solvents.

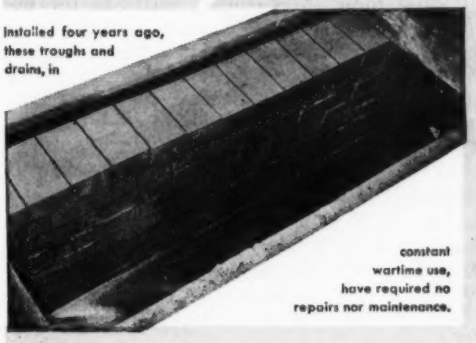


TYPICAL FLOOR CONSTRUCTION

DRAIN OR TANK LINING



PROTECTION FOR SUPPORTS



Installed four years ago, these troughs and drains, in constant wartime use, have required no repairs nor maintenance.

PROPERTIES

Chemical Resistance — Inert to: Alkalis, fats, oils, solvents, fresh or salt water, steam, all mineral acids including hydrofluoric acid, with exception of high concentrations of strong oxidizing acids such as nitric, chromic and many organic acids, and alternate contact with strong acid and alkali.

Attacked by strong oxidizing agents.

Color	Black
Permissible temp. in use	Up to 375° F.
Absorption (ASTM)	Less than 0.5%
Compressive strength	12,000-14,000 lbs. per sq. in.
Tensile strength	1,000-2,000 lbs. per sq. in.
Modulus of rupture	1,800-2,100 lbs. sq. in.
Coefficient of thermal expansion	.0000087 inches/inch/degree F. (In range 80-350° F.)
Porosity	Completely impermeable, even at elevated temperatures. It is non-porous.
Joint thickness recommended	⅛-¼ inch
Mortar required to butter one 9 inch brick on 3 sides	½ lb. (approximately)
Storage	Can be stored indefinitely in a cool place.
Hardening time	Pennsalt PRF Cement construction may be placed in service within twenty-four hours.

Containers (Non-returnable)	POWDER	SOLUTION
	20 lb. drum	10 lb. drum
	100 " "	50 " "
	250 " "	375 " "

SPECIAL CHEMICALS DIVISION PRODUCTS

Acid, Alkali, and Solvent proof cements—Acid, Alkali, and Solvent Emulsion Type Cleaners—Paint strippers—Pickling Agents—Rust Inhibitor.

SPECIAL CHEMICALS DIVISION
PENNSYLVANIA SALT MANUFACTURING COMPANY
Dept. P.T.J.-2, 1000 Widener Building, Philadelphia 7, Pa.

I would like to have you send me free booklet on Pennsalt PRF Cement.

NAME_____

TITLE_____

COMPANY_____

ADDRESS_____

Special Chemicals Division

PENNSYLVANIA SALT MANUFACTURING COMPANY

Chemicals

1000 Widener Building, Philadelphia 7, Pa.

NEW YORK • CHICAGO • ST. LOUIS • PITTSBURGH • CINCINNATI • MINNEAPOLIS • WYANDOTTE • TACOMA

engineered for cutting, threshing, granulating, flocking and defibering, and a wing type pulley or belt saver.

Sturtevant Mill Co.

The exhibit of the Sturtevant Mill Company will include a photographic display of many of the concern's types of equipment, together with a description of the many types of materials which may be processed by our units.

It is expected that there will also be displayed a Syphon Header which is manufactured for the Poirier Control Company.

Represented at the exhibit will be J. S. Vrabek, vice president and sales manager; A. T. Glynn, sales engineer; Wm. T. Doyle, executive vice president and general manager; and G. P. Towle, treasurer.

Swenson Evaporator Co.

The Swenson Exhibit at the Grand Central Palace will be in Booth 43. It will be largely pictorial covering the complete Swenson line of evaporators, filters, crystallizers, pulp washers and spray drying equipment. In attendance will be: G. E. Seavoy, H. B. Caldwell, W. D. Kohlins, J. R. Lientz, J. E. Kearney, R. E. Bergstrom and A. Francis.

U. S. Steel Corp.

At the display of the United States Steel Corporation, stainless and heat resisting steels are featured in two special exhibits. One outlines in animated fashion the new 11-section handbook "Fabrication of Stainless and Heat Resisting Steels" which includes: welding, riveting, soldering, joint design, machining, cutting, forming, annealing, finishing, tabular data, and hand samples; and the other, the 22 analyses of steels suitable for use in refineries and similar applications in the chemical industries. A line of stainless steel drums as manufactured by United States Steel Products Company will also be shown.

Cooperating in this exhibit are the following subsidiaries of United States Steel Corporation: Carnegie-Illinois Steel Corporation, Columbia Steel Company, National Tube Company, Tennessee Coal, Iron and Railroad Company, United States Steel Products Company, United States Steel Supply Company, and United States Steel Corporation Coal Chemicals Division.

Wallace & Tiernan Products, Inc.

The Wallace and Tiernan Products, Inc. exhibits equipment to show applications of intermittent chlorination processes. It features the importance of continuity of operation, unobstructed by microbiological slime accumulations that interfere with heat transfer and that otherwise require unit shut down for cleaning. It will feature the influence of continuous maintenance of maximum heat exchange efficiency on the design of new plants and plant extensions, and will include factors of fuel, labor and maintenance savings for the chemical process plant and for central and industrial power plants.

Yale & Towne Mfg. Co.

The exhibit of the Yale and Towne Manufacturing Company consists of complete coverage of Materials Handling Machinery including Hand and Electric Hoists, Hand Lift and Electric Industrial Trucks and Industrial Dial Scales. A motion picture is also projected which shows good handling practice employing various types of electric industrial trucks. It is designed to give manufacturers suggested ideas and methods of solving a wide range of handling problems.

Representatives present include, S. W. Gibb, J. D. Young, M. G. Peck, W. G. Tipton, C. O. Hedner, A. C. Ferdon, R. J. McGreevy, W. L. Burghardt, C. K. Drury, Warner F. DeFoe, W. E. Clapp, W. F. Redmond, Carl E. Lang and W. F. Randall.

Issues Kraft Paper Prices

WASHINGTON, D. C., February 18, 1946—In answer to many inquiries as to the ceiling prices on imported kraft papers, the Office of Price Administration today said that existing delivered dollar-and-cent ceilings for standard grades of kraft wrapping and bag papers also apply on import sales.

For other than standard grades, importers may pay the same prices that they or other importers paid for such grades from October 1 to 15, 1941, the base period commonly observed in paper price ceiling regulations.

Where such non-standard grades were not imported during this base period, application should be made to OPA's national office in Washington, D. C., Paper and Paper Products Price Branch, for a special ceiling price. The agency said that such applications would be given ceilings in line with the existing ceilings for the closest competitive domestic grade.

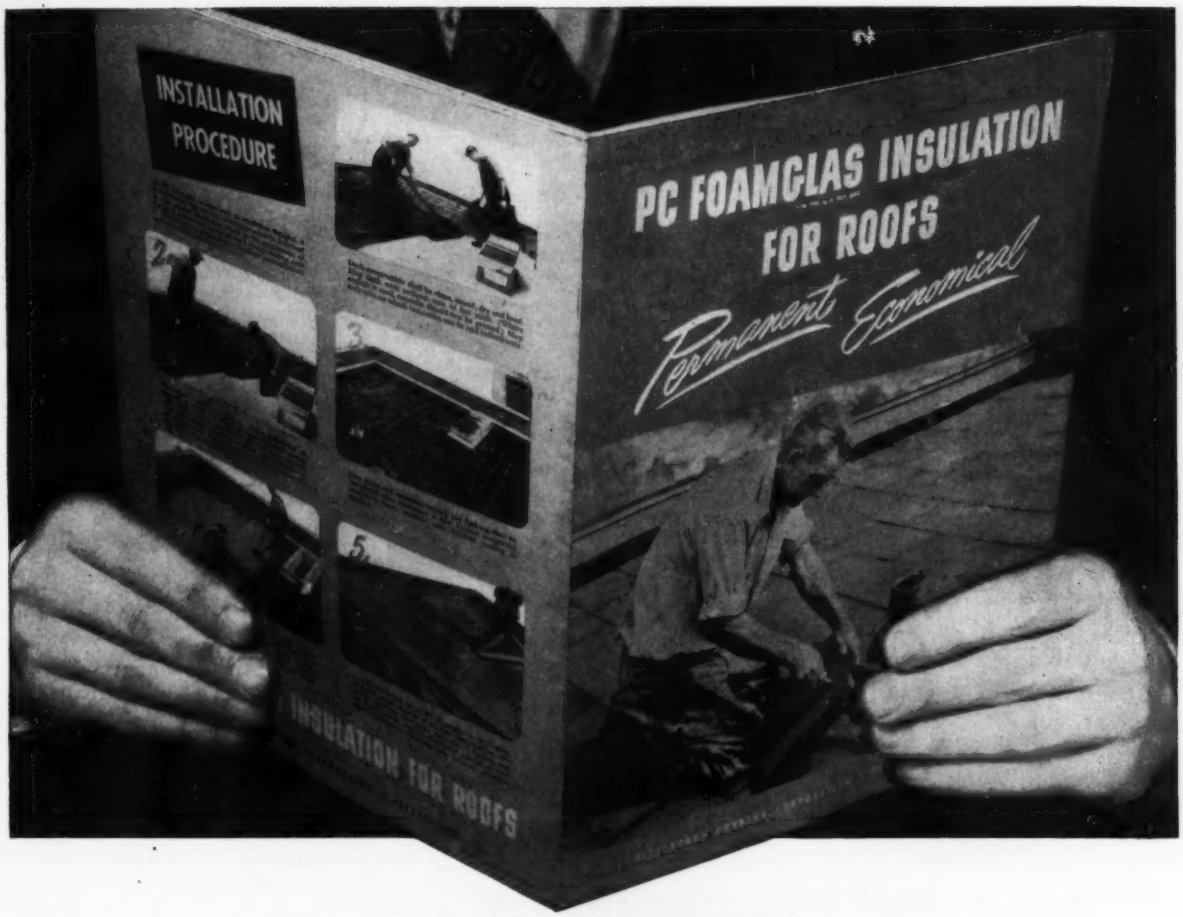
These dollar-and-cent ceilings are listed in Maximum Price Regulation 182-Kraft Wrapping Papers. A supplementary order specified that this regulation covered imported as well as domestic kraft papers.

The other two pricing methods for non-standard grades are provided in Revised Maximum Price Regulation 129—Certain Industrial Papers, which was amended to include imports.

In outlining these three simple methods for determining ceiling prices, OPA said that imported kraft papers, notably from Sweden, are now becoming available again after being off the market during the war years. With kraft papers still scarce, naturally there has been considerable interest in imports to meet the domestic demand.

For the convenience of prospective importers, OPA listed the delivered price ceilings, per hundred pounds, for the principal standard grades of kraft wrapping and bag paper. They follow:

Standard kraft wrapping paper (40 pound and heavier)	$4.75
No. 1 kraft wrapping paper (40 pound and heavier)	5.00
Superstandard kraft wrapping paper (40 pound and heavier)	5.25
Imitation kraft wrapping paper (40 pound and heavier)	4.50
Standard unbleached kraft butchers' wrapping paper (40 pound and heavier)	5.00
No. 1 unbleached kraftbutchers' wrapping paper (40 pound and heavier)	5.25
Machine glazed kraft wrapping paper (25 pound and heavier) (Southern Mills)	5.50
(Northern Mills)	5.75
Standard kraft bag paper (30 pound and heavier)	4.375
Variety kraft bag paper (30 pound and heavier)	4.625
Machine glazed kraft bag paper (25 pound and heavier) (Southern Mills)	5.25
(Northern Mills)	5.50



Get this *FREE BOOK* of Roof Insulation Facts

WHEN you have a roofing problem that includes insulation it will pay you to have this book.

It tells you how to select PC Foamglas blocks of the proper thickness to do each job most efficiently and economically.

It contains complete engineering data, all the facts you want about PC Foamglas. The text is supplemented by graphs, charts, tables, and pictures of actual roof insulating jobs.

On the roofs of more and more paper mills PC Foamglas Insulation is meeting extreme conditions effectively, economically.

In all sorts of plants, on tanks and processing equipment, in ceilings, floors and core walls, this cellular glass insulation helps to maintain temperature and humidity levels, to control condensation—*permanently.*

We have drawn freely on facts acquired from satisfied users in compiling our book. You will find it a practical guide, including instructions and specifications for installing PC Foamglas on various types of roofs. Fill in and mail the coupon.

You incur no obligation. Pittsburgh Corning Corporation, 632 Duquesne Way, Pittsburgh 22, Pa.

THIS BOOK TELLS YOU . . . Eight points to check in selecting roof insulation . . . How to select the right thickness of Foamglas for eight types of roofs, for a full range of temperatures and humidities . . . How to install Foamglas, from preparation of roof deck to finished roofing.

· *Also makers of PC Glass Blocks* ·

MAIL COUPON TODAY

Pittsburgh Corning Corporation
Room 116, 632 Duquesne Way
Pittsburgh 22, Pa.

Please send me your booklet entitled, "PC Foamglas Insulation for Roofs." I incur no obligation.

*Name*_____

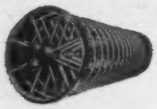
*Address*_____

*City*_____ *State*_____

PC FOAMGLAS *Waterproof Fireproof* **INSULATION**

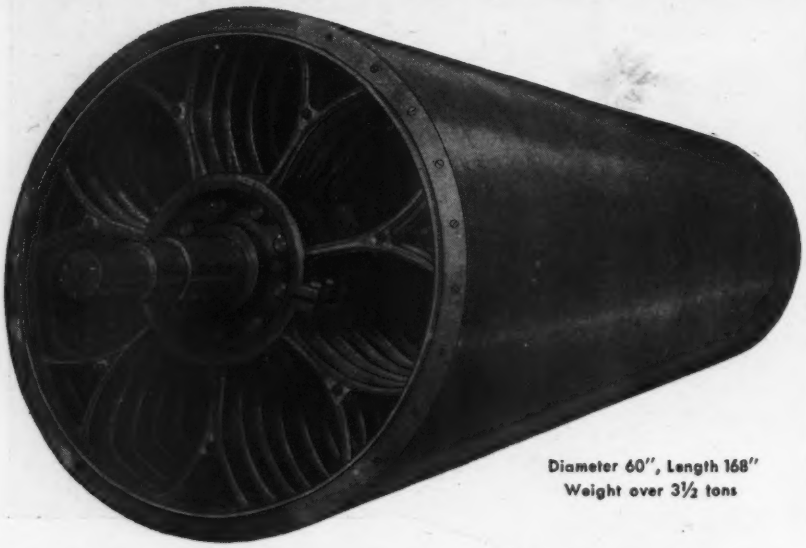
T. M. REG. U. S. PAT. OFF.

from the smallest . . .



Diameter 12", Length 72"
Weight 800 lbs.

. . . to the LARGEST



Diameter 60", Length 168"
Weight over 3½ tons

BUILT AND RECONDITIONED

Small cylinder moulds only 12" in diameter, or huge ones five times as large weighing more that 3½ tons—Cheney Bigelow is equipped to build and recondition cylinders of *any* size, type and material.

For more than a century Cheney Bigelow has been servicing old cylinder moulds and making new ones. A cylinder mould built by us in 1895, for example, has just been received for reconditioning. We offer you engineers and craftsmen who know their job thoroughly . . . the latest in modern equipment . . . expanded plant facilities to handle a larger volume of work than ever before.

Whatever your cylinder problem or need, Cheney Bigelow is prepared to take care of it quickly and well.

CHENEY BIGELOW

Fourdrinier Wires • • Dandys • • Cylinders • • Wire Cloth

CHENEY BIGELOW WIRE WORKS • 417 LIBERTY STREET • SPRINGFIELD, MASS.

Newsprint for 39 Days

Daily newspapers reporting to the American Newspaper Publishers Association show that stocks of newsprint paper on hand were 39 days supply at the end of January 1946 which is an increase of 2 days supply compared with stocks on hand at the end of December 1945. This 39 days supply at the end of January 1946 compares with 54 days at the end of January 1945; 56 days at the end of January 1944; 63 days at the end of January 1943 and 45 days at the end of January 1941.

The inventory regulation of the Civilian Production Administration amended Jan. 22, 1946 permits a ceiling of 30 days in some states and 50 days in other states. The ANPA figures are an average for the entire country.

Daily newspapers reporting to the ANPA consumed 221,054 tons of newsprint paper in January 1946, compared with 185,193 tons in 1945 and 229,799 tons in 1941. This was an increase in January 1946 over January 1945 of 19.4% and a decrease under January 1941 of 3.8%. 1941 was the base year for calculating allowable use by newspapers under WPB Order L-240 until revoked effective Dec. 31, 1945.

The total estimated newsprint consumption in the United States for January 1946 was 311,344 tons which includes all kinds of uses of newsprint paper.

Henry Eaton Retires

Henry T. Eaton has retired as vice-president of Crocker, Burbank Paper Inc. of Fitchburg, Mass., and manager of the New York office. Mr. Eaton started his career in the paper business in 1904, spending two years in the Monadnock Paper Mills, Bennington, N. H., preliminary to coming to New York. He joined the selling force of Clarke & Co. in the late fall of 1906 and became a partner in that firm in 1920. In 1938 Crocker, Burbank Papers, Inc., succeeded to the business of Clarke & Company and Mr. Eaton became vice-president in charge of the New York Office, remaining in that capacity until his retirement.

Donald A. Douglass succeeds Mr. Eaton as manager of the New York office.

Sergeant Adds Servicemen

Lt. Wm. C. Boyle, recently released from the Navy, and Edgar Sergeant Jr. recently released from the Army, have joined the sales staff of the E. M. Sergeant Pulp and Chemical Company, Inc., New York.

NEPMA Elects Dwyer

BOSTON, MASS., February 18, 1946—James J. Dwyer, Stone & Forsyth Company, this city, was elected president of the New England Paper Merchants Association, Inc., at the annual meeting and dinner at the Boston City Club February 5. Approximately 100 members were present.

Other officers elected were Paul M. Jones, Storrs & Bement Company, first vice-president (fine); Walter G. Butler, Perkins & Butler, Inc., Worcester, Mass. (Wrapping); F. Bendel Tracy, Fort Hill Paper Company, secretary, and Frank B. Cummings, Newton, Mass., treasurer.

Directors: Neil S. Beckwith, Carter Paper Company, Springfield, Mass., representing Western Massachusetts; Floyd H. Blackman, D. F. Munroe Company; Charles A. Esty, Carter, Rice & Co., Corp.; Donald L. Gibbs, Kendall Paper Company, Cambridge, Mass.; Samuel L. Ginsburg, Ginsburg Brothers, Inc., Somerville, Mass.; Abraham E. Goldstein, United Paper Company, Woonsocket, R. I., representing Rhode Island and Southern Massachusetts; J. Frank Halloran, Century Paper Company.

Zonner Joins Appleton

APPLETON, WIS., February 15, 1946—W. A. Zonner has joined the Appleton Machine Company as a sales engineer. He gained his experience in the manufacture of book and coated papers with the Mead Corporation in Chillicothe, Ohio, where he spent eleven years. In 1935 he became connected with the Consolidated Water Power & Paper Company at Wisconsin Rapids at about the time this mill commenced the manufacture of coated book papers. Here he spent eleven years as department superintendent. In the 22 years devoted to the paper industry Mr. Zonner has acquired a broad knowledge in the manufacture and finishing of book coated and specialty papers. This knowledge and experience the Appleton Machine Company now places at the disposal of mills contemplating or already engaged in the manufacture of these grades of paper.

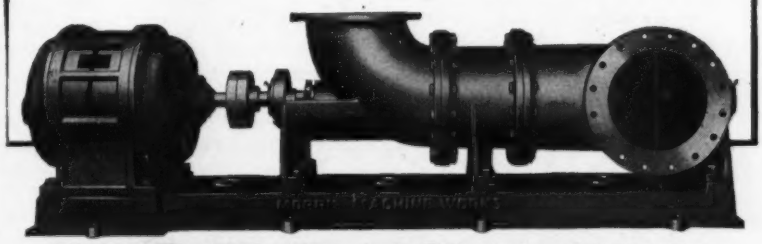
Palatka Mill Ready Soon

PALATKA, FLA., February 14, 1946—Informed sources here state that the Hudson Pulp and Paper mill will be producing paper inside of nine months. Construction of a $10,000,000 unit of the mill is underway.

Variable Capacity

FOR VAT CIRCULATION

using a standard constant-speed induction motor



MORRIS STRAIGHTFLO PUMP

Through separate by-pass line, unwanted output can be discharged back into the suction.

Here's the high-volume, low-head pump you need for vat circulation, plus variable capacity—and driven by the simplest possible power unit, with a standard constant-speed induction motor. None of the efficiency losses associated with a wound-rotor, variable-speed A.C. motor! No necessity for expensive D.C. installations! No need for hydraulic or electric couplings!

Morris Horizontal Straightflo (axial flow) Pumps hold capacity to any given volume by by-passing unwanted portions of the discharge back into the suction. A simple, easily-controlled by-pass valve in the discharge piping, furnished by the customer, turns the trick. Contrary to usual centrifugal-pump experience, the Morris Straightflo Pump uses *less* horsepower as the capacity is increased.

Engineered to Specific Needs

Like all Morris pumps, the Straightflo models are built to the specific requirements of the job, designed for optimum performance under all the conditions to be encountered. The propeller is of the open-screw type with large, unobstructed ports. There are no internal bearings to wear out—entire shaft load taken by two *external* anti-friction bearings. The stuffing boxes are part of the discharge and suction elbows and are designed for ample packing to insure tightness without undue pressure on the gland. Elbows can be furnished in almost any position desired. Write for bulletin No. 167.

MORRIS MACHINE WORKS

Builders of Morris Centrifugal Pumps Since 1864

Baldwinsville, N. Y.

Sales Offices in Principal Cities

MORRIS CENTRIFUGAL PUMPS

Goodyear Names Service Men

AKRON, Ohio, February 15, 1946—Returned service men are finding places of responsibility in the expanding post-war program of the Chemical Products division of The Goodyear Tire & Rubber Company, to handle civilian demands for war-proved materials. C. P. Joslyn, division manager, has made known a number of placements in the Pliofilm, Plastics and Coatings, and the Research and Development departments, with other servicemen slated for posts as soon as they are released from military duty.

The Pliofilm department, which during the war saw its entire output taken by the armed services for the packaging of airplane engines and other delicate instruments as a protection against rust and corrosion, has placed two servicemen in the Atlanta district. J. S. Brewster, Cedartown, Ga., native, who was a captain in the AAF, is there as a sales representative, and T. D. Strickland, Jr., formerly a lieutenant commander in the Navy, as a specialist in vegetable packaging. Mr. Strickland is an Atlanta native.

E. J. Hill, native of Cincinnati, who served as a major with U. S. Army Ordnance at Kelly-Springfield, Cumberland, Md., has joined the Plastics and Coatings staff with headquarters in Detroit, handling Michigan territory. Ray Earhart, captain of an armored infantry company in the European theater, has been placed in the Sales Training staff with headquarters in Akron.

Another returned serviceman is Dr. James E. Snyder, a lieutenant colonel in the Army, who has been assigned to the Development department in charge of work on packaging materials, applications and equipment. Dr. Snyder is a native of Carlisle, Pa.

Lockport Felt Elects Directors

NEWFANE, N. Y., February 15, 1946—At the annual meeting of the Lockport Felt Company, held on January 15, the following officers and directors were elected: William H. Lee, President and General Manager; Elizabeth M. Lee, Vice President; Bertram A. Audley, Secretary; Raymond J. Lee, Treasurer. The following constitutes **the Board of Directors:** William H. Lee, B. A. Stockwell, Bertram A. Audley, Raymond J. Lee, and William W. Campbell, Jr.

Sales representatives from all territories in the United States met with the management for a two-days' meeting on January 16 and 17 to discuss plans for the coming year. William H. Lee, president and general manager, outlined in detail the extension program now under way. This calls for added plant facilities and new equipment of the latest modern design in keeping with the improving paper making conditions. With the exception of making blankets for the Navy and boot cloth for the Army during the war, the Lockport Felt Company has the distinction of confining its entire efforts for the last fifty-five years to the manufacture of papermakers' felts.

"With the present demand for paper," said Mr. Lee, "it is imperative that we place ourselves in a position to meet the unprecedented requirements of the paper mills. We can do just that," he said. Another meeting is planned for September of this year.

M. M. M. Advances Kelley

Manning, Maxwell & Moore, Inc., has appointed J. Robert Kelley as executive vice-president of the corporation.

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H. D. MARTINDALE

Who after twenty years as vice-president of the company has been elected president of the Black-Clawson Company, succeeding in that post Herman L. Kutter.

Varlon Elects Williams

CHICAGO, February 15, 1946—John E. Williams was elected vice-president of Varlon, Inc., a division of United Wallpaper, Incorporated, at the regular monthly meeting of the board of directors held here today. The board of directors also declared a regular quarterly dividend of $1.50 per share on 7,000 shares outstanding of prior preference stock. The dividend is payable March 1, 1946 to stockholders of record February 19, 1946.

Williams joined United Wallpaper, Inc., a year ago to head the newly formed Varlon division. During the last year he has been active in planning and directing the various programs pertaining to the production and launching of Varlon, the new stain-proof wall covering recently announced by Varlon, Inc.

Kimball Incorporates

BOSTON, MASS., February 18, 1946—The Kimball Paper Stock Corporation, 33 Patton street, Springfield, Mass., waste paper and wiping rags has been incorporated with a capital stock of 500 common shares. Irving S. Kimball is president; Julius Kimball, treasurer and clerk, and Pearl S. Kimball is third incorporator.

Shapiro Enlarges Quarters

BOSTON, MASS., February 18, 1946—The Shapiro Paper Company, handling paper products and paper specialties, has enlarged quarters at 39 Hartford Street, taking over the space formerly occupied by E. F. Hauserman Company.

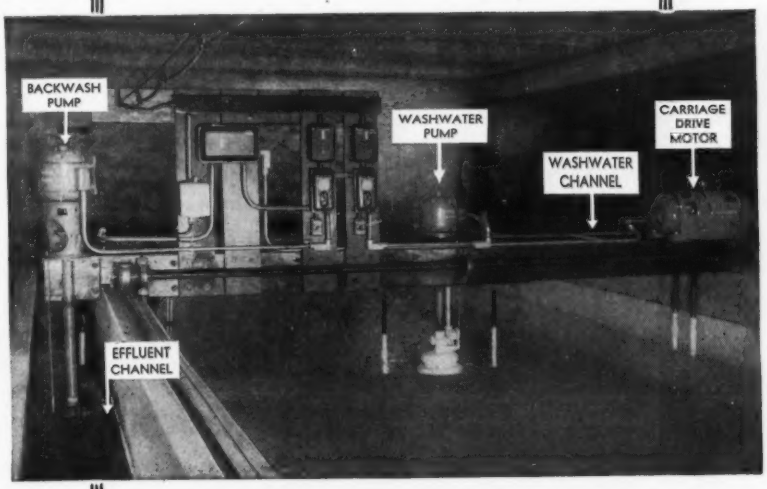
Old Colony Elects

WESTFIELD, Mass., February 15, 1946—J. A. Chadbourne was elected president of the Old Colony Envelope Company at its annual meeting. S. G. Ashley, was elected vice-president; H. J. Rice, clerk; H. F. Burrows, treasurer; and G. P. Rice, assistant treasurer. In addition to the officers listed the Board of Directors includes H. A. Moses and F. N. Bridgham.

Knirk Joins Kinsley

CLEVELAND, Ohio, February 15, 1946—As part of a post war expansion program, H. L. Kinsley, president of the Kinsley Chemical Company, has appointed Carl H. Knirk as sales manager of the paper chemicals division. Mr. Knirk has recently obtained his discharge from the Army where he served overseas with the Infantry. He is a graduate of the Wharton School of the University of Pennsylvania. The Kinsley company manufactures de-inking and de-colorizing chemicals.

NEW AND NEEDED



AN EFFLUENT FILTER of truly remarkable design is now offered by Hardinge to the paper and pulp industry. Known as the *Automatic Backwash Rapid Sand Filter*, it is particularly useful to paper mills in handling waste water or excess white water. Fibre and filler may be recovered and reused, leaving water sufficiently free of suspended solids for reuse on showers. The filter may also be advantageously used in the treatment of the raw water supply for paper mills. This photograph of a paper mill installation shows essential parts of the system.

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PAPER
TRADE JOURNAL
Title Reg. U. S. Pat. Off.
W. L. Cook, Editor

CHEMICAL INDUSTRIES EXHIBITS

As chemical knowledge and the application of chemical science and engineering are so widely used in the pulp and paper industry, the opening of the Twentieth Exposition of Chemical Industries on February 25 is an important event to many readers of the PAPER TRADE JOURNAL. This exposition is a permanent organization whose purpose is to promote the relationship between research, industrial organization and the media of products, through visualization, demonstration and personal consultation. This objective is attained by holding expositions once every two years to bring together at one time the latest developments of research and inventive application of all that is new and presently available for commercial utilization.

The field of the exposition comprises the production of chemicals, the entire range of chemical processing and the use of chemicals in connection with mechanical processes of all kinds. The exposition, therefore, serves directly the pulp and paper industry and many other important industries which employ chemical science and chemical engineering to produce alterations in the composition and properties of matter during the course of manufacture. The emphasis is on materials, methods and machinery, and it is difficult to imagine a single line of human interest or industrial enterprise that is outside its influence. We may then say that the Exposition of Chemical Industries is a display of materials, scientific apparatus and processing equipment, exhibited by specialists. Some of the latter concentrate exclusively on a single material, product, process or class of machinery. A much larger number include allied interests so that they cover not merely a single line but a band of specialized applications.

A large number of the exhibits, of particular interest to the pulp and paper industry are described in some detail in this issue and others will appear in a subsequent issue of the PAPER TRADE JOURNAL. Many of the exhibits reach into many fields, through by-product development, through natural aptitude for dissimilar applications and also through consolidation of associated interests. Quite a number of exhibitors represent the merging of several smaller units in a larger and stronger organizations of greatly increased scope. Thus, even a brief reference to the exhibits in this issue alone, will indicate that one of the prime services performed by the exposition is to show the current alignment of sources of supply for the chemical industries in respect to materials, processing equipment and research facilities, with reference to the technical support which they may be able to provide in the development of new products and in the improvements of established products.

The resumption of the exposition this month is especially timely because it follows promptly after cessation of hostilities and while the industrial reconversion is still in its early and formative stages. Many of the inventions there were bound up in the secret military program are now available for adaption to commercial uses. Many commercial products and processes that were restricted to government uses during the war, are now available to free enterprise. New manufacturing techniques have multiplied to an extraordinary degree since the last of these expositions and are now available for the first time, and it is not too much to say that more new developments will be revealed in the forthcoming event.

A wide range of manufactures is embraced by the specialized devices offered by a number of the exhibitors. For example, a full line of valves is offered in stainless steels, pure nickel, aluminum Hastelloy of four different types, pure silver and many others. Among the newer structural materials, widely used, are the nickel-base Hastelloys, which combine high strength with resistance to severe conditions of chemical corrosion. Such materials are designed to withstand the corrosive action of the common mineral acids, as sulphuric, over a wide range of temperatures and concentrations and also to resist such powerful oxidizing agents as wet chlorine. There will also be samples in the as-cast condition of parts produced for various industries by a new precision casting process developed to handle the high-temperature alloys and also stainless steel and other refractory metals. Another exhibit will show samples of clad steel and besides other information concerning steel making will include a new double shell drier roll which assures higher steam pressures and so increases output in the production of paper and roofing material. Also on display will be finished machined centrifugal castings in brass, bronze, alloy irons, Monel, Ni-Resist, chromium and stainless steels, which has wide applications in many industries. Laminated metals will attract attention where corrosive containers and conveyors are required.

Calendar of Coming Events

February 25-28, 1946.—American Paper and Pulp Association. Annual Convention, Waldorf Astoria Hotel, New York.

February 25-28, 1946.—Technical Association of the Pulp and Paper Industry, Annual Convention, Commodore Hotel, New York.

February 28, 1946.—Waxed Paper Institute, Annual Meeting, Hotel Pennsylvania, New York.

March 20, 1946—National Association of Waste Material Dealers, Victory Banquet, Hotel Astor, New York.

April 1-3, 1946.—National Paper Trade Association, Annual Convention, Waldorf Astoria Hotel, New York.

June 17-20, 1946.—American Pulp and Paper Mill Superintendents Association, Annual Convention, Poland Spring, Me.

The trend toward continuous processing will be noted in connection with a wide range of processing in the new "fingertip" control method of metering and applying sulphur dioxide. To permit electrolytic reaction processes with corrosive chemicals, a manufacturer of armored stoneware kettles has evolved a porous ceramic diaphragm. Instruments for laboratory, control testing are to be represented in considerable number. In addition to the exhibits featuring laboratory equipment there are featuring dispersion mixing techniques, vacuum mixers, complete displays of humidity apparatus, ovens, electric heaters and controls, pumps and stirrers, coating thickness gauges, polarimetric analyzers and many others. The exposition also includes a good representation of material handling equipment, such as piping and other liquid handling equipment, conveyors, trucks, lifts and hoists, packaging equipment and systems of packaging.

Mead Mill to Require New Water Plant

MACON, Ga., February 15, 1946—It is estimated that the daily water supply to be required by the $10,000,000 Mead Paper Company plant to be built here will be almost double that of the entire city of Macon. According to a local newspaper (Telegraph), the city uses an average of 9,000,000 gallons daily. The plant will need at least 15,000,000 each day.

The city cannot meet the demand, so Meade will build its own Ocmulgee pumping station at a cost of between $750,000 and $1,000,000.

Shortage Threatens Georgetown

SPARTANBURG, S. C., February 15, 1946—An acute shortage of pulpwood has cut production at the International Paper Company's mill at Georgetown, S. C., and threatens to force part-time operations, according to dispatches from that city.

Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

Current Weeks—1946		Corresponding Weeks—1945	
Jan. 5	89.1	Jan. 6	81.0
Jan. 12	95.3	Jan. 13	88.7
Jan. 19	94.4	Jan. 20	89.0
Jan. 26	94.5	Jan. 27	88.4
Feb. 2	101.5	Feb. 3	88.8
Feb. 9	99.7	Feb. 10	90.1

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1945	86.7	89.4	90.2	88.1	89.8	91.2	80.8	88.6	90.2	95.9	95.5	91.0	89.7
1946	*94.7*												

COMPARATIVE YEARLY SUMMARIES

	1939	1940	1941	1942	1943	1944	1945	1946
Year to Date	77.4	88.7	86.5	104.1	87.4	88.7	86.4	*95.4*
Year Average	83.4	85.6	97.4	90.4	87.8	88.1	89.7	

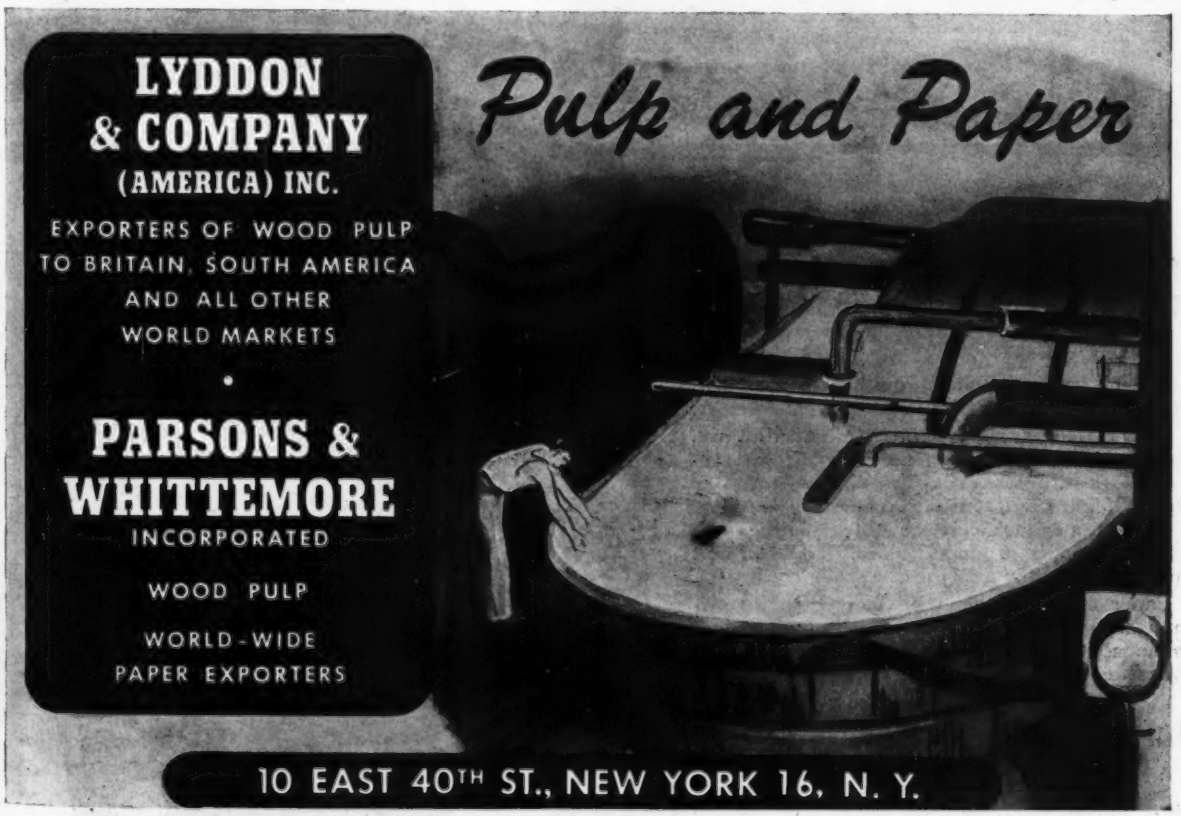
* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

PAPERBOARD OPERATING RATIOS †

Current Weeks—1946		Corresponding Weeks—1945	
Jan. 5	75	Jan. 6	80
Jan. 12	94	Jan. 13	95
Jan. 19	93	Jan. 20	94
Jan. 26	94	Jan. 27	95
Feb. 2	95	Feb. 3	92
Feb. 9	97	Feb. 10	*93*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1945	91	95	97	97	96	96	86	90	91	97	95	85	93
1946	*90*												

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Assn.



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TELEGRAM
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Bring your problems on new paper product developments and product improvements to the TAPPI meeting where members of the CYANAMID TECHNICAL SERVICE STAFF will be on hand to assist you.

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****Trade-mark of American Cyanamid & Chemical Corporation covering its synthetic resins for use by the paper industry. The processes under which PAREZ is applied in the production of wet strength paper are covered by U.S. Patents Nos. 2,291,079, 2,291,080 and 2,345,543 and U.S. Patent Application Serial No. 453,032.**

Section of the
TECHNICAL ASSOCIATION
OF THE PULP & PAPER INDUSTRY
122 E. 42nd St., New York 17, N. Y.
Edited by R. G. Macdonald, Secretary

Simple Method for Predicting the Brightness of Mixed Pulp Furnishes*

By William J. Foote[1]

Abstract

A simple method for calculating the brightness of mixed fiber furnishes from the brightness of the individual pulps is given. The relationship is based on the Kubelka and Munk equation.

There are considerable data presented in the literature on the optical properties of papermaking materials much of which has been of a highly technical nature. It is possible, however, to develop a simple empirical relationship between the brightness of individual pulps and that of their mixtures. Use of this relationship should be of value in predicting the brightness resulting from postwar furnish changes or changes in bleaching practice as governmental restrictions are removed. It is also a useful tool in analyzing certain brightness anomalies encountered in using mixed furnishes.

When light is incident upon paper, part of it is reflected, part is transmitted, and part is absorbed and scattered. Expressions for the diffuse reflection from *homogeneous* materials in terms of fundamental constants have been derived by various investigators. The most commonly used is the Kubelka and Munk equation:

$$R\infty = 1 + (K/S) - [(K/S)^2 + 2\,(K/S)]^{0.5} \qquad (1)$$

Where K = Absorption Coefficient of the material,
S = Scattering Coefficient, and
$R\infty$ = the Reflectance of a pad thick enough to be opaque. (If the measurement is made on the No. 1 filter of the G.E. Reflection Meter, it will be "papermakers'" brightness.)

The above equation may be transformed into a more workable form by solving for (K/S). It then becomes:

$$(K/S) = \frac{(R\infty - 1)^2}{2\,R\infty} \qquad (2)$$

This means that the reflectance can be completely described in terms of two coefficients which represent the fractions of the incident light lost (1) by absorption, and (2) by scattering per unit thickness of material. However, it must be stressed that only the ratio of K to S is determined by a single measurement of $R\infty$. Table I gives K/S values for a wide range of brightnesses.

Pulp Mixtures

Now, although paper is not a homogeneous material, it follows the Kubelka and Munk relationship well enough so that it may be used to predict the brightnesses of mixed furnishes with a fairly good degree of accuracy.

A simplified treatment (which is fundamentally incorrect, but remarkably accurate in practice) involves the use of the following equation:

$$(K/S)_{\text{mixture}} = C_1\,(K/S)_1 + C_2\,(K/S)_2 \qquad (3)$$

Where C = the fraction of each component present in the mixture and the subscripts refer to the first and second component.

Figure 1 demonstrates the alidity of equation 3 in predicting the brightness of mixtures of a groundwood (brightness 60) and a bleached sulphite (brightness 84). The solid line represents calculated values and the points indicate experimental values. The dotted line shows the weighted arithmetic average and demonstrates how the duller pulp predominates in producing the brightness of the mixture.

To illustrate the manner in which the relationship may be utilized, a series of mixtures will be calculated. In a 50-50 groundwood—bleached sulphite mixture, the groundwood having a brightness of 60, and the

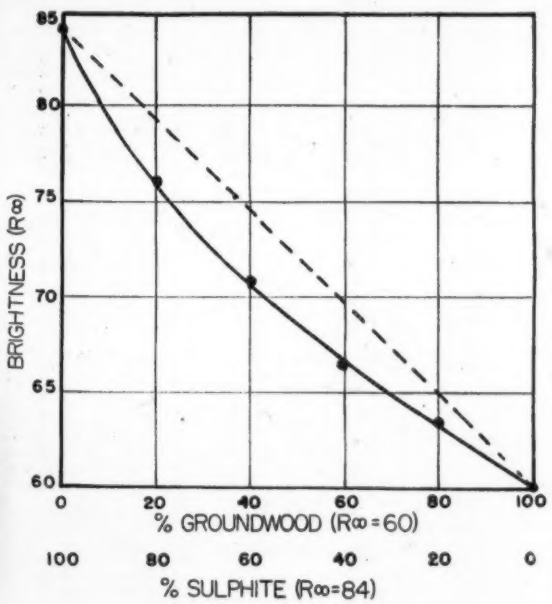


FIG. 1
Brightness of Groundwood—Sulphite Mixtures

* To be presented at the Annual Meeting of the Technical Association of the Pulp and Paper Industry, Hotel Commodore, New York, N. Y., Feb. 25-28, 1946.

[1] Member TAPPI; Chief Chemist, Consolidated Water Power and Paper Co., Wisconsin Rapids, Wis.

bleached sulphite 80, the brightness of the mixture will be found as:

$$(K/S) = (0.5 \times 0.1333) + (0.5 \times 0.0250)$$
$$(K/S) = 0.0792$$
$$R\infty = 67.3$$

If the groundwood brightness is increased 10 points,

$$(K/S) = (0.5 \times 0.0643) + (0.5 \times 0.0250)$$
$$(K/S) = 0.0447$$
$$R\infty = 74.3 \text{ (an overall increase of 7.0 points).}$$

If, however, the sulphite brightness is increased 10 points,

$$(K/S) = (0.5 \times 0.1333) + (0.5 \times 0.0056)$$
$$(K/S) = 0.0695$$
$$R\infty = 69.0 \text{ (an overall increase of only 1.7 points)}$$

Calculations of this type explain many unusual results encountered when running furnishes containing pulps at different brightness levels. The equation is equally valid for furnishes containing more than two pulps.

It must be stressed again that the calculation is only accurate for pulp handsheets. It does not allow for the loss in brightness which occurs on the paper machine. Nevertheless, it will be of considerable value in predicting the direction of trends and the approximate magnitude of changes in brightness caused by varying the fiber furnish.

Effect of Additions

Strictly speaking, clay in the furnish cannot be handled so simply, but up to 10% clay does not ordinarily throw the calculations off too far. As a matter of fact, the increase in brightness caused by small amounts of clay will just about offset the loss in color of the pulp in going over the drier section.

The effect of high-strength pigments, such as titanium dioxide and zinc sulphide, cannot be calculated from equation 3. This is because the S values of these highly refractive materials are of an entirely different order of magnitude from the S values of pulps.

As mentioned before, a single measurement of $R\infty$ determines only the ratio, K/S. To determine K or S individually, it is necessary to make an additional reflectance measurement, $R_{R'}$, of a known thickness, X, over a background of reflectance, R', and then to

TABLE I.—RELATION OF R∞ TO (K/S)

R∞	K/S	R∞	K/S	R∞	K/S	R∞	K/S	R∞	K/S
20.0	1.6000	21.0	1.4860	22.0	1.3827	23.0	1.2889	24.0	1.2033
.1	1.5881	.1	1.4752	.1	1.3729	.1	1.2800	.1	1.1952
.2	1.5763	.2	1.4645	.2	1.3633	.2	1.2712	.2	1.1871
.3	1.5646	.3	1.4539	.3	1.3537	.3	1.2624	.3	1.1791
.4	1.5530	.4	1.4435	.4	1.3441	.4	1.2538	.4	1.1712
.5	1.5415	.5	1.4331	.5	1.3347	.5	1.2452	.5	1.1633
.6	1.5301	.6	1.4228	.6	1.3254	.6	1.2366	.6	1.1555
.7	1.5190	.7	1.4127	.7	1.3161	.7	1.2282	.7	1.1478
.8	1.5079	.8	1.4026	.8	1.3070	.8	1.2198	.8	1.1401
.9	1.4968	.9	1.3926	.9	1.2979	.9	1.2116	.9	1.1325
25.0	1.1250	26.0	1.0531	27.0	0.9869	28.0	0.9257	29.0	0.8691
.1	1.1175	.1	1.0462	.1	0.9805	.1	0.9199	.1	0.8637
.2	1.1101	.2	1.0394	.2	0.9742	.2	0.9141	.2	0.8583
.3	1.1028	.3	1.0326	.3	0.9680	.3	0.9083	.3	0.8529
.4	1.0955	.4	1.0259	.4	0.9618	.4	0.9026	.4	0.8477
.5	1.0883	.5	1.0193	.5	0.9557	.5	0.8969	.5	0.8424
.6	1.0811	.6	1.0127	.6	0.9496	.6	0.8913	.6	0.8372
.7	1.0740	.7	1.0062	.7	0.9436	.7	0.8857	.7	0.8320
.8	1.0670	.8	0.9997	.8	0.9376	.8	0.8801	.8	0.8269
.9	1.0600	.9	0.9933	.9	0.9316	.9	0.8746	.9	0.8217
30.0	0.8167	31.0	0.7679	32.0	0.7225	33.0	0.6802	34.0	0.6406
.1	0.8116	.1	0.7632	.1	0.7181	.1	0.6761	.1	0.6368
.2	0.8066	.2	0.7586	.2	0.7138	.2	0.6720	.2	0.6330
.3	0.8017	.3	0.7539	.3	0.7095	.3	0.6680	.3	0.6292
.4	0.7967	.4	0.7494	.4	0.7052	.4	0.6640	.4	0.6255
.5	0.7918	.5	0.7448	.5	0.7010	.5	0.6600	.5	0.6218
.6	0.7870	.6	0.7403	.6	0.6967	.6	0.6561	.6	0.6181
.7	0.7822	.7	0.7358	.7	0.6926	.7	0.6522	.7	0.6144
.8	0.7774	.8	0.7313	.8	0.6884	.8	0.6483	.8	0.6108
.9	0.7726	.9	0.7269	.9	0.6843	.9	0.6444	.9	0.6072
35.0	0.6036	36.0	0.5689	37.0	0.5364	38.0	0.5058	39.0	0.4771
.1	0.6000	.1	0.5655	.1	0.5332	.1	0.5028	.1	0.4743
.2	0.5965	.2	0.5622	.2	0.5301	.2	0.4999	.2	0.4715
.3	0.5929	.3	0.5589	.3	0.5270	.3	0.4970	.3	0.4688
.4	0.5894	.4	0.5556	.4	0.5239	.4	0.4941	.4	0.4660
.5	0.5860	.5	0.5524	.5	0.5208	.5	0.4912	.5	0.4633
.6	0.5825	.6	0.5491	.6	0.5178	.6	0.4883	.6	0.4606
.7	0.5791	.7	0.5459	.7	0.5148	.7	0.4855	.7	0.4580
.8	0.5757	.8	0.5427	.8	0.5118	.8	0.4826	.8	0.4553
.9	0.5723	.9	0.5395	.9	0.5088	.9	0.4799	.9	0.4526
40.0	0.4500	41.0	0.4245	42.0	0.4005	43.0	0.3778	44.0	0.3564
.1	0.4474	.1	0.4221	.1	0.3982	.1	0.3756	.1	0.3543
.2	0.4448	.2	0.4196	.2	0.3958	.2	0.3734	.2	0.3522
.3	0.4422	.3	0.4172	.3	0.3935	.3	0.3712	.3	0.3502
.4	0.4396	.4	0.4147	.4	0.3913	.4	0.3691	.4	0.3481
.5	0.4371	.5	0.4123	.5	0.3890	.5	0.3669	.5	0.3461
.6	0.4345	.6	0.4099	.6	0.3867	.6	0.3648	.6	0.3441
.7	0.4320	.7	0.4075	.7	0.3845	.7	0.3627	.7	0.3421
.8	0.4295	.8	0.4052	.8	0.3822	.8	0.3606	.8	0.3401
.9	0.4270	.9	0.4028	.9	0.3800	.9	0.3585	.9	0.3381
45.0	0.3361	46.0	0.3170	47.0	0.2988	48.0	0.2817	49.0	0.2654
.1	0.3342	.1	0.3151	.1	0.2971	.1	0.2800	.1	0.2638
.2	0.3322	.2	0.3133	.2	0.2953	.2	0.2783	.2	0.2623
.3	0.3303	.3	0.3114	.3	0.2936	.3	0.2767	.3	0.2607
.4	0.3283	.4	0.3096	.4	0.2919	.4	0.2751	.4	0.2592
.5	0.3264	.5	0.3078	.5	0.2901	.5	0.2734	.5	0.2576
.6	0.3245	.6	0.3060	.6	0.2884	.6	0.2718	.6	0.2561
.7	0.3226	.7	0.3042	.7	0.2867	.7	0.2702	.7	0.2545
.8	0.3207	.8	0.3024	.8	0.2850	.8	0.2686	.8	0.2530
.9	0.3188	.9	0.3006	.9	0.2833	.9	0.2670	.9	0.2515
50.0	0.2500	51.0	0.2354	52.0	0.2215	53.0	0.2084	54.0	0.1959
.1	0.2485	.1	0.2340	.1	0.2202	.1	0.2071	.1	0.1947
.2	0.2470	.2	0.2326	.2	0.2189	.2	0.2059	.2	0.1935
.3	0.2455	.3	0.2312	.3	0.2175	.3	0.2046	.3	0.1923
.4	0.2441	.4	0.2298	.4	0.2162	.4	0.2033	.4	0.1911
.5	0.2426	.5	0.2284	.5	0.2149	.5	0.2021	.5	0.1899
.6	0.2411	.6	0.2270	.6	0.2136	.6	0.2008	.6	0.1888
.7	0.2397	.7	0.2256	.7	0.2123	.7	0.1996	.7	0.1876
.8	0.2383	.8	0.2243	.8	0.2110	.8	0.1984	.8	0.1864
.9	0.2368	.9	0.2229	.9	0.2097	.9	0.1971	.9	0.1853
55.0	0.1841	56.0	0.1729	57.0	0.1622	58.0	0.1521	59.0	0.1425
.1	0.1829	.1	0.1718	.1	0.1612	.1	0.1511	.1	0.1415
.2	0.1818	.2	0.1707	.2	0.1601	.2	0.1501	.2	0.1406
.3	0.1807	.3	0.1696	.3	0.1591	.3	0.1491	.3	0.1397
.4	0.1795	.4	0.1685	.4	0.1581	.4	0.1482	.4	0.1388
.5	0.1784	.5	0.1675	.5	0.1571	.5	0.1472	.5	0.1378
.6	0.1773	.6	0.1664	.6	0.1561	.6	0.1462	.6	0.1369
.7	0.1762	.7	0.1653	.7	0.1551	.7	0.1453	.7	0.1360
.8	0.1751	.8	0.1643	.8	0.1541	.8	0.1443	.8	0.1351
.9	0.1740	.9	0.1632	.9	0.1531	.9	0.1434	.9	0.1342
60.0	0.1333	61.0	0.1247	62.0	0.1165	63.0	0.1087	64.0	0.1013
.1	0.1325	.1	0.1238	.1	0.1157	.1	0.1080	.1	0.1005
.2	0.1316	.2	0.1230	.2	0.1149	.2	0.1071	.2	0.0998
.3	0.1307	.3	0.1221	.3	0.1141	.3	0.1064	.3	0.0991
.4	0.1298	.4	0.1213	.4	0.1133	.4	0.1056	.4	0.0984
.5	0.1290	.5	0.1205	.5	0.1125	.5	0.1049	.5	0.0977
.6	0.1281	.6	0.1197	.6	0.1117	.6	0.1042	.6	0.0970
.7	0.1272	.7	0.1189	.7	0.1110	.7	0.1034	.7	0.0963
.8	0.1264	.8	0.1181	.8	0.1102	.8	0.1027	.8	0.0956
.9	0.1255	.9	0.1173	.9	0.1094	.9	0.1020	.9	0.0950
65.0	0.0942	66.0	0.0876	67.0	0.0813	68.0	0.0753	69.0	0.0696
.1	0.0936	.1	0.0869	.1	0.0807	.1	0.0747	.1	0.0691
.2	0.0929	.2	0.0863	.2	0.0801	.2	0.0741	.2	0.0685
.3	0.0922	.3	0.0857	.3	0.0794	.3	0.0736	.3	0.0680
.4	0.0915	.4	0.0850	.4	0.0788	.4	0.0730	.4	0.0675
.5	0.0909	.5	0.0844	.5	0.0782	.5	0.0724	.5	0.0669
.6	0.0902	.6	0.0838	.6	0.0776	.6	0.0719	.6	0.0664
.7	0.0895	.7	0.0831	.7	0.0771	.7	0.0713	.7	0.0659
.8	0.0889	.8	0.0825	.8	0.0765	.8	0.0707	.8	0.0653
.9	0.0882	.9	0.0819	.9	0.0759	.9	0.0702	.9	0.0648
70.0	0.0643	71.0	0.0592	72.0	0.0544	73.0	0.0499	74.0	0.0457
.1	0.0638	.1	0.0587	.1	0.0540	.1	0.0495	.1	0.0453
.2	0.0633	.2	0.0583	.2	0.0535	.2	0.0491	.2	0.0449
.3	0.0627	.3	0.0578	.3	0.0531	.3	0.0486	.3	0.0445
.4	0.0622	.4	0.0573	.4	0.0526	.4	0.0482	.4	0.0440
.5	0.0617	.5	0.0568	.5	0.0522	.5	0.0478	.5	0.0436
.6	0.0612	.6	0.0563	.6	0.0517	.6	0.0474	.6	0.0432
.7	0.0607	.7	0.0559	.7	0.0513	.7	0.0469	.7	0.0428
.8	0.0602	.8	0.0554	.8	0.0508	.8	0.0465	.8	0.0425
.9	0.0597	.9	0.0549	.9	0.0504	.9	0.0461	.9	0.0421
75.0	0.0417	76.0	0.0379	77.0	0.0344	78.0	0.0310	79.0	0.0279
.1	0.0413	.1	0.0375	.1	0.0340	.1	0.0307	.1	0.0276
.2	0.0409	.2	0.0372	.2	0.0337	.2	0.0304	.2	0.0273
.3	0.0405	.3	0.0368	.3	0.0333	.3	0.0301	.3	0.0270
.4	0.0401	.4	0.0365	.4	0.0330	.4	0.0298	.4	0.0267
.5	0.0398	.5	0.0361	.5	0.0327	.5	0.0294	.5	0.0264
.6	0.0394	.6	0.0357	.6	0.0323	.6	0.0291	.6	0.0261
.7	0.0390	.7	0.0354	.7	0.0320	.7	0.0288	.7	0.0259
.8	0.0386	.8	0.0350	.8	0.0317	.8	0.0285	.8	0.0256
.9	0.0383	.9	0.0347	.9	0.0314	.9	0.0282	.9	0.0253
80.0	0.0250	81.0	0.0223	82.0	0.0198	83.0	0.0174	84.0	0.0152
.1	0.0247	.1	0.0220	.1	0.0195	.1	0.0172	.1	0.0150
.2	0.0244	.2	0.0218	.2	0.0193	.2	0.0170	.2	0.0148
.3	0.0242	.3	0.0215	.3	0.0190	.3	0.0167	.3	0.0146
.4	0.0239	.4	0.0213	.4	0.0188	.4	0.0165	.4	0.0144
.5	0.0236	.5	0.0210	.5	0.0186	.5	0.0163	.5	0.0142
.6	0.0234	.6	0.0208	.6	0.0183	.6	0.0161	.6	0.0140
.7	0.0231	.7	0.0205	.7	0.0181	.7	0.0159	.7	0.0138
.8	0.0228	.8	0.0203	.8	0.0179	.8	0.0157	.8	0.0136
.9	0.0226	.9	0.0200	.9	0.0176	.9	0.0155	.9	0.0134
85.0	0.0132	86.0	0.0114	87.0	0.0097	88.0	0.0082	89.0	0.0068
.1	0.0130	.1	0.0112	.1	0.0096	.1	0.0080	.1	0.0067
.2	0.0129	.2	0.0111	.2	0.0094	.2	0.0079	.2	0.0065
.3	0.0127	.3	0.0109	.3	0.0092	.3	0.0078	.3	0.0064
.4	0.0125	.4	0.0107	.4	0.0091	.4	0.0076	.4	0.0063
.5	0.0123	.5	0.0105	.5	0.0089	.5	0.0075	.5	0.0062
.6	0.0121	.6	0.0104	.6	0.0088	.6	0.0073	.6	0.0060
.7	0.0119	.7	0.0102	.7	.0086	.7	0.0072	.7	0.0059
.8	0.0118	.8	0.0100	.8	0.0085	.8	0.0071	.8	0.0058
.9	0.0116	.9	0.0099	.9	0.0083	.9	0.0069	.9	0.0057

use the Kubelka and Munk equation which interrelates $R\infty$, $R_{R'}$, and SX.

The reason for desiring to know S and K individually is that the equation relating the (K/S) of a mixture to the (K/S) of the components is given more accurately by:

$$(K/S)_{1,2,\ldots n} = \frac{K_1 + K_2 + \ldots K_n}{S_1 + S_2 + \ldots S_n} \qquad (4)$$

provided that the components absorb and scatter light independently of each other. Equation 4 must be used in place of equation 3 in any case where the S values of the components are not of the same order of magnitude. Treatment of these more complex cases may be found in several of the articles cited below.

Literature Cited

1. Day, G. A., *Paper Mill* 62, No. 41: 14, 19-20 (Oct. 14, 1939).
2. Foote, W. J., *Paper Trade Journal* 109, No. 25: 31-8 (Dec. 21, 1939).
3. Harrison, W. D., *Paper Trade Journal* 105, No. 13: 39-45 (Sept. 23, 1937).
4. Judd, D. B., *J. Research Natl. Bur. Standards* 19: 287 (1937).
5. Judd, D. B., *Paper Trade Journal* 101, No. 5: 40-1 (Aug. 1, 1935).
6. Judd, D. B., *Paper Trade Journal* 106, No. 1: 39-46 (Jan. 6, 1938).
7. Judd, D. B., *Paper Trade Journal* 100, No. 1: 28-32 (Jan. 3, 1935).
8. Lewis, L. C., *Paper Trade Journal* 103, No. 22: 43-50 (Nov. 26, 1936).
9. Nolan, P., *Paper Trade Journal* 105, No. 14: 42-5 (Sept. 30, 1937).
10. Steele, F. A., *Paper Trade Journal* 100, No. 12: 37-42 (Mar. 21, 1936).
11. Steele, F. A., *Paper Trade Journal* 104, No. 8: 157-8 (Feb. 25, 1937).

TAPPI Notes

Howard L. Winslow, Jr., formerly of the U. S. Army, is now in the research and development department of the American Reinforced Paper Co., Attleboro, Mass.

Lt. Roscoe Masterman, U.S.N.R. is now paper machine foreman, International Paper Company, Chisholm, Me.

Ben F. Warren, chief industrial engineer, Crown Zellerbach Corp., has been transferred from San Francisco to the Public Service Building, Portland 4, Ore.

Lt. Col. Joseph E. Atchison, C.W.S., is now a student at the Institute of Paper Chemistry, Appleton, Wis.

Robert E. Bundy, formerly of the Federal Container Company, is now general operating manager, Fibreboard Products, Inc., 710 Russ Building, San Francisco, Cal.

The Clinton Company, Clinton, Iowa, has changed its corporate name to Clinton Industries, Inc. The Clinton Sales Co., Inc., remains unchanged.

Frank Zeitlin of the West Virginia Pulp & Paper Company has been transferred from Mechanicville, N. Y. to Luke, Md.

Leon M. Tyler, formerly of the Aetna Paper Company, is now chemist for the Howard Paper Company, Urbana, Ohio.

G. C. Schmidt, formerly of the Falulah Paper Company, is now chief chemist of the Cellutin Corp., Holyoke, Mass.

J. M. Kernan, formerly of the Container Corporation of America, is now factory superintendent, National Folding Box Company, New Haven, Conn.

Benton R. Cancell, formerly of the War Production Board, is now vice president, Powell River Company, Ltd., Standard Bank Bldg., Vancouver, B. C.

P. R. Sandwell is now assistant chief engineer, Ontario Paper Co., Ltd., Thorold, Ont.

Albert Yraola, formerly of the Hinde and Dauch Paper Co. Ltd., is now chief chemist for the Seaman Paper Company, 222 W. Adams St., Chicago 6, Ill. His mail address is 122 Dowling Ave., Toronto 3, Ont.

Earl P. Lovenheim, formerly of the Ancram Paper Mills, is now paper mill manager, Simplicity Pattern Company, Inc., Niles, Mich.

Wentworth Brown, formerly of the Brown Corp., La Tuque, P. Q., is now vice president of the Brown Corp., and production manager of the Brown Company, Berlin, N. H.

Major Fred E. Culp, C.W.S., is now with the Consolidated Water Power and Paper Company, Wisconsin Rapids, Wis. In an earlier announcement it was stated that Capt. Culp was formerly of the U. S. Navy.

Col. Roy C. Charron, C.W.S., has completed five years of military service and has returned to the United States Envelope Company, Worcester, Mass., as research director.

O. E. S. Hedbring, formerly of the Ohio Boxboard Company is now Assistant to the Vice President, United Paperboard Company, Thomson, N. Y.

Walter E. Savell, formerly of the Mathieson Alkali Works is now chief research chemist in the laboratory of advanced engineering at Remington-Rand, South Norwalk, Conn.

John E. Parnell, formerly of the Tennessee Eastman Corporation is now in the research department of the Crossett Lumber Company, Crossett, Ark.

F. A. Garrett of the Canadian International Paper Company, Three Rivers, P. Q., received the Weldon Medal of the Canadian Pulp & Paper Association. Mr. Garrett will present a paper at the TAPPI annual meeting in New York this month.

George D. Knight, formerly of the U. S. Army is now at the Institute of Paper Chemistry, Appleton, Wis.

James H. Compton, Jr., formerly of General Mills, Inc., is now sales and development engineer for the Georgia-Kaolin Company, Elizabeth, N. J.

The joint meeting of the Pacific section of the Technical Association of the Pulp and Paper Industry and the Pacific Division of the Superintendents Association will be held at the Gearhart Hotel, Gearhart, Ore., on May 17-18, 1946.

F. C. Vaughan, formerly of the U. S. Machinery Company, is now with the Carthage Machine Company and located at Crewe, Va.

Richard Estabrook, formerly of the Chicopee Mfg. Company is now with the Maine Seaboard Paper Company, Bucksport, Me.

Recent visitors to the United States include: Julius Grant, general manager, New Bury Paper Mills, Ltd., Lancashire, England.

W. F. Goldsmith, manager, Hawaiian Cane Products Company, Hilo, Hawaii.

Otto Nordstrom, president, A/B Celleco, Uppsala, Sweden.

T. Frankel and B. Talbot of Wiggins, Teape & Company, Ltd., London, England.

L. T. Rys, director of Harmanec Paper Mills, Czechoslovakia.

Correction: TAPPI Standard T 448 m-45, Water Vapor Permeability of Paper and Paperboard:—In the second line of the second complete paragraph in the first column of the second page the words "using the tare" should be deleted.

The TAPPI Ohio Section will meet at the Manchester Hotel, Middletown, Ohio, on March 7th. There will be a discussion of The Microscope as a Papermaking Tool.

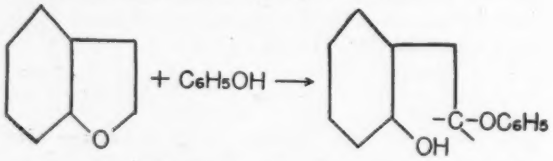
Thiophenol Spruce Lignin*

By F. E. Brauns[1] and William H. Lane[2]

Abstract

Lignin can be extracted almost completely from sprucewood with thiophenol in the presence of a small amount of hydrogen chloride with formation of a mixture of thiophenol lignins of which three have been isolated and purified. The ether-dioxane insoluble thiophenol lignin A has been methylated with diazomethane and with dimethyl sulphate. Thiophenol lignin A and its diazomethane-methylated product have been acetylated. Isolated native spruce lignin also condenses with thiophenol to form a mixture of condensation products from which a thiophenol native lignin containing three thiophenol groups per lignin building unit has been isolated. This product was also methylated with diazomethane.

It is a well-known fact that lignin can be extracted from lignified materials by phenol in the presence of 0.5 to 1% hydrogen chloride as a catalyst *(1, 2, 3)*. The conditions are very mild, the reaction taking place at a low temperature (80 to 90° C.) and being quantitatively finished in 0.5 to 1 hour. In this reaction the lignin reacts with the phenol with formation of phenol lignin. The crude phenol lignin from sprucewood can be separated into two fractions: phenol lignin A, insoluble in dioxane-ether mixture (1:25) with a methoxyl content of 10.5%; and phenol lignin B, having a methoxyl content of 5.3%, soluble in this mixture. The yield of the former is about 75% and of the latter 25% *(3)*. The mechanism by which the phenol reacts with the lignin is still unknown but, in the case of phenol lignin A, three new phenolic hydroxyl groups are present which may have been formed either by the opening of a furan or pyran ring with simultaneous formation of a phenol ether:



or by condensation of the phenol through its *p*-hydrogen atom with the lignin molecule, leaving the original hydroxyl group of the phenol free. On the basis of a molecular weight of 840 for the lignin building unit *(4)*, three of the four phenol molecules which enter the lignin molecule seem to react in such a way that three new phenolic hydroxyl groups appear in the phenol lignin A, whereas one phenol molecule seems to react with formation of a phenol ether. In any case, the phenol molecules are attached to the lignin quite firmly as they are not split off when the phenol lignin is distilled with 12% hydrochloric acid.

In the case of phenol lignin B, a considerably larger number of phenol molecules have entered the lignin building unit. The high carbon content, the low methoxyl content, and the large increase of the latter on methylation with diazomethane indicate that 15 to 20 phenol molecules have reacted with a lignin building unit. In this case a part of the phenol molecules are split off when the product is distilled with 12% hydrochloric acid *(5)*.

When hydrochloric acid spruce lignin is treated with phenol under the same conditions, a phenol lignin condensation product similar to phenol lignin A is formed in almost quantitative yield. This indicates that that part of the original lignin which gives phenol lignin B has been changed during the treatment with supersaturated hydrochloric acid, probably because of a condensation reaction.

As already found by Holmberg *(6)*, thio compounds (such as benzyl mercaptan and thioglycolic acid) react readily with lignin to form condensation products soluble in organic solvents. Holmberg and also Ahlm and Brauns *(7)* found that thioglycolic acid reacts with spruce lignin with the formation of a tetrathioglycolic acid spruce lignin—i.e., four thioglycolic acid groups enter the lignin building unit. Unlike the phenol groups in phenol lignin A, two of the thioglycolic acid molecules are relatively easily split off *(7)*.

Because thiophenol or phenyl mercaptan has both phenol and mercaptan properties, it is of interest to study the reaction of thiophenol with lignin. The presence of sulphur in thiophenol offers also a convenient way to determine the number of thiophenol groups which enter the lignin.

Experimental

Preparation of Thiophenol Spruce Lignin

Black sprucewood meal (60 mesh, 75 grams air-dry), previously extracted with benzene-alcohol and water, was heated with 300 grams of thiophenol containing 1.05 grams of anhydrous hydrogen chloride for 5 hours. The excess of thiophenol was distilled from the reddish-brown solution under reduced pressure as far as possible. The residue was first extracted with dioxane and then in a Soxhlet apparatus with a mixture (1:1) of acetone and methanol. The combined extracts were distilled to dryness *in vacuo* and the viscous residue kept for several days in a vacuum desiccator over sulphuric acid to remove the last traces of thiophenol. For purification, the product was taken up in dioxane to give a 10% solution, centrifuged, and filtered. The clear dark reddish-brown solution was then added to anhydrous ether, causing the separation of thiophenol lignin A as a light cream powder. This purification was repeated four times, after which a constant methoxyl content of 10.22% was obtained. Its sulphur content was 10.15%. The dark reddish dioxane-ether mother liquor was concentrated and the viscous residue extracted with anhydrous ether, yielding an ether-insoluble thiophenol lignin B and an ether-soluble fraction, which was not further investigated. The former was redissolved in methanol and dropped into water, giving thiophenol lignin B with 6.45% methoxyl and 13.6% sulphur. From the dioxane-ether mother liquors of the second, third, and fourth purifications of thiophenol lignin A, thiophenol lignin C with a methoxyl content of 7.5%

* A portion of a thesis submitted by W. H. Lane in partial fulfillment of the requirements of The Institute of Paper Chemistry for the degree of Master of Science from Lawrence College, Appleton, Wis., May, 1940.

Presented by title at the Annual Meeting of the Technical Association of the Pulp & Paper Industry, Hotel Commodore, New York, N. Y., Feb. 25-28, 1946.

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[2] Student, The Institute of Paper Chemistry. Present address, Monsanto Chemical Company, Texas City, Texas.

and a sulphur content of 9.9% was isolated. All these thiophenol lignins were treated with 72% sulphuric acid under the conditions used in the Klason lignin determination method and the products obtained were purified from dioxane and ether. Their analytical data are given in Table I.

TABLE I.—ANALYTICAL DATA FOR THE THIOPHENOL LIGNINS BEFORE AND AFTER TREATMENT WITH 72% SULPHURIC ACID

	Before Treatment		After Treatment	
Lignin Derivative	MeO, %	S, %	MeO, %	S, %
Thiophenol lignin A	10.22	10.15	11.5	9.2
Thiophenol lignin B	6.45	13.6	8.66	11.7
Thiophenol lignin C	7.5	9.9	11.66	9.4

The residual pulp from the thiophenol extraction (obtained in 53.1% yield) was white in color, in spite of the fact that it still contained 8.36% Klason lignin with a methoxyl content of 11.7% and a sulphur content of 8%.

Acetylation of Thiophenol Lignin A

To a solution of 0.7 gram of thiophenol lignin A in 7 ml. of anhydrous pyridine, 5 ml., of acetic anhydride were added and the mixture kept for 72 hours at room temperature. The acetyl derivative was isolated by pouring the mixture on cracked ice and was purified by dissolving it in acetone and pouring the solution into distilled water. It separated as a light cream powder, soluble in dioxane, acetone, and pyridine. Its analysis is given in Table II.

Methylation of Thiophenol Lignin A with Diazomethane

A solution of 5 grams in 50 ml. of dioxane was treated with diazomethane until a constant methoxyl content of 14.25% was obtained. A sample of this product was acetylated and purified as described above. The analyses are given in Table II.

Complete Methylation of Thiophenol Lignin A

A solution of 3.6 grams of diazomethane-methylated thiophenol lignin A in 50 ml. of acetone was methylated by simultaneous addition of 25 ml. of dimethyl sulphate and 50 ml. of sodium hydroxide (30 vol.-%) at 25° over a period of 1 hour. This treatment was repeated four times, after which a constant methoxyl content was obtained. The product was isolated by distilling off the acetone. It was filtered, washed thoroughly with distilled water, and purified by dropping its dioxane solution into anhydrous ether. It was obtained as an orange-yellow powder. The analysis is given in Table II.

Preparation of Thiophenol Native Spruce Lignin

When 5 grams of native spruce lignin are suspended in 40 ml. of thiophenol, the lignin swells but does not dissolve. On addition of 0.2 gram of anhydrous hydrogen chloride, the color of the mixture changes to red-brown and the lignin begins to go into solution. After the reaction mixture had been heated for 1 hour, the lignin was almost completely dissolved. The deep red-brown solution was concentrated *in vacuo*, during which a small amount of water distilled over with the thiophenol. Since the reagents were dry, this water must have been formed during the reaction. The resinous residue was taken up in dioxane and the thiophenol native lignin isolated as a light brown powder by dropping the solution into anhydrous ether. The yield was 2.3 grams. After another purification the methoxyl content was constant. From the mother liquor, a thiophenol lignin derivative with 10.9% methoxyl and 9.1% sulphur was isolated but not further investigated. A sample of the thiophenol native lignin was methylated with diazomethane to a constant methoxyl content. The analytical data are given in Table II.

TABLE II.—ANALYSIS OF THIOPHENOL LIGNIN AND DERIVATIVES

Compound	Mol. Wt.	No. of Thiophenol Groups	No. of Methoxyl Groups	No. of Acetyl Groups	% Methoxyl		% Sulphur	
					Calculated	Found	Calculated	Found
1. Thiophenol lignin A	1244	4	4	..	9.98	10.22	10.3	10.15
2. 1 acetylated	1412	4	4	4	8.8	9.2	9.08	8.62
3. 1 methylated with diazomethane	1149	3	5	..	13.5	14.25	8.37	8.62
4. 3 acetylated	1275	3	5	3	12.12	12.8	7.5	7.9
5. 3 completely methylated	1127	2	10	..	27.45	27.8	5.67	5.40
6. Thiophenol native spruce lignin....	1152	3	4	..	10.8	11.03	8.33	8.52
7. 6 methylated with diazomethane	1056	2	5	..	14.68	15.85	6.06	6.8

Discussion

When sprucewood meal is heated with thiophenol containing a small amount of hydrogen chloride for 5 hours at 100° C., over 90% of the lignin goes into solution, from which it is isolated as a light cream powder. The residual pulp still contains 8.4% lignin with 11.7% methoxyl and 8.0% sulphur, indicating that this residual lignin has also reacted with thiophenol. The thiophenol lignin can be separated into three fractions: thiophenol lignin A, which is insoluble in dioxane-ether and has a methoxyl content of 10.22% and a sulphur content of 10.15%; thiophenol lignin B, which is obtained by extracting the residue from the ether-dioxane mother liquor from the first fraction with ether as an insoluble residue and contains 6.45% methoxyl and 13.6% sulphur; and thiophenol lignin C, with 7.5% methoxyl and 9.9% sulphur, which is obtained as an ether-insoluble powder on extraction of the residue from the second to fourth purifications of thiophenol lignin A. Thiophenol lignins B and C give Klason lignins with 8.7 and 11.65% methoxyl and 11.7 and 9.4% sulphur, respectively, and small amounts of reducing material in the filtrates. Neither of these lignins has been investigated further. Thiophenol lignin A gives a Klason lignin with 11.5% methoxyl and 9.2% sulphur and is free of carbohydrate material. The methoxyl and sulphur contents of thiophenol lignin A are almost identical. Since the molecular weight of a methoxyl group (31.02) and the atomic weight of sulphur (32.06) are practically the same, it is evident that the number of methoxyl groups and sulphur atoms in the thiophenol lignin A must be the same. If no methoxyl is split off in the reaction, thiophenol lignin A contains four thiophenol groups per lignin building unit. The molecular weight X of such a lignin building unit can be calculated from its methoxyl and sulphur contents by the following equations:

$$(4 \times 31.02 \times 100)/X = 10.22 \text{ and } (4 \times 32.06 \times 100)/X = 10.15.$$

From these equations, X is found to be 1214 and 1263 (average of 1238), which agrees well with the molecular weight of 1244 obtained by the addition of the molecular weight of four thiophenol molecules (440) to 840 (molecular weight of the lignin building unit) and subtracting two molecules of water. The theoretical methoxyl and sulphur contents for such a tetrathiophenol spruce lignin are 9.98% and 10.3%, respectively. The somewhat higher methoxyl content and the slightly lower sulphur content found may be

because of the fact that the reaction with thiophenol was not quite complete.

In a similar way it is found that thiophenol lignin B contains six thiophenol groups and three methoxyl groups for which, on a basis of a molecular weight of 1452, a methoxyl content of 6.4% and a sulphur content of 13.25% are calculated; for thiophenol lignin C with four thiophenol groups and three methoxyl groups, a methoxyl content of 7.55 and a sulphur content of 10.4 are calculated (*see* Table II). The yields of these fractions are approximately 3:1:1.

On acetylation of thiophenol lignin A with acetic anhydride and pyridine, four acetyl groups are introduced. Methylation of thiophenol lignin A with diazomethane increases the methoxyl content from 10.4 to 14.25% and decreases the sulphur content from 10.15 to 8.6%. This decrease in sulphur is much larger than is to be expected from the increase in methoxyl and can be explained only by a splitting off of a thiophenol group or by partial replacement of a thiophenol group by a methoxyl group. For a diazomethane-methylated thiophenol lignin with five methoxyl groups and three thiophenol groups, a methoxyl content of 13.5% and a sulphur content of 8.37% are calculated. It is known that, in certain cases, diazomethane replaces acyl groups by methoxyl groups *(8)*. On acetylation of the diazomethane-methylated thiophenol lignin, three acetyl groups are introduced, indicating that one hydroxyl group in the original thiophenol lignin A has been methylated with diazomethane. Methylation of the diazomethane-methylated thiophenol lignin A with dimethyl sulphate and sodium hydroxide results in a completely methylated thiophenol spruce lignin with 27.83% methoxyl and 5.4% sulphur. The ratio of methoxyl to sulphur in this compound is 5:1. The low sulphur content indicates that a second of the four thiophenol groups originally present has been split off. The compound contains, therefore, ten methoxyl groups and two thiophenol groups.

After it was found that, in the extraction of lignin with thiophenol, at least three thiophenol lignin derivatives of different compositions are obtained, the action of thiophenol upon isolated native spruce lignin was studied. In this case also, a mixture of condensation products was obtained from which an ether-dioxane insoluble product was isolated as an apparently uniform compound. Its low sulphur content of 8.5% (as compared with 10.16% for thiophenol lignin A) indicates that only three thiophenol groups have entered the lignin building unit. The molecular weight of the thiophenol native lignin building unit containing three thiophenol molecules and assuming that one molecule of water is split off would be $840 + 330 - 18 = 1152$, for which a methoxyl content of 10.8% and a sulphur content of 8.33% are calculated. On methylation with diazomethane, a thiophenol group is again partially replaced by a methoxyl group in addition to one new methoxyl group, as can be seen from the calculated and found methoxyl and sulphur contents. The theoretical analytical data and the found values are given in Table II.

Conclusions

Thiophenol reacts with spruce lignin and hydrogen chloride as a catalyst with the formation of at least three condensation products. This indicates that this reaction is more complicated than the reaction of lignin with phenol *(3)*. The dioxane-ether insoluble thiophenol lignin A has four thiophenol groups but only one hydroxyl group capable of methylation with diazomethane, indicating that no new phenolic hydroxyl groups are formed. Although the number of thiophenol groups is the same as that of phenol groups in phenol lignin A, a part of the thiophenol groups is loosely combined and is split off in the subsequent reactions. Isolated native spruce lignin reacts with thiophenol and gives a mixture of condensation products from which a thiophenol native lignin is isolated which, unlike the phenol lignin A, contains only three thiophenol groups.

Literature Cited

1. Legeler, E., *Cellulosechem.* 4: 61 (1923).
2. Hillmer, A., *Cellulosechem.* 6: 169 (1925).
3. Buckland, I. K., Brauns, F. E., and Hibbert, H., *Can. J. Research* 13B: 61 (1935).
4. Brauns, F. E., *J. Am. Chem. Soc.* 61: 2120 (1939).
5. Unpublished work. The Institute of Paper Chemistry, 1942.
6. Holmberg, B., The mercaptolysis of spruce wood. The Royal Swedish Institute for Engineering Research, No. 103. Stockholm, 1930.
7. Ahlm, C. E., and Brauns, F. E., *J. Am. Chem. Soc.* 61: 277 (1939).
8. Herzig, J., and Tichatscheck, J., *Ber.* 39: 268, 1551 (1906).

New TAPPI Members

The Executive Committee of the Technical Association of the Pulp and Paper Industry has elected the following to membership:

Abbott Byfield, Superintendent, Pilot Plant Section —Technical Department, Kimberly-Clark Corp., Neenah, Wis., a 1939 graduate of Massachusetts Institute of Technology.

Everett F. Carman, Consulting Chemist, 155 Highland Ave., Montclair, N. J., a 1936 graduate of the University of Chicago.

Robert E. E. Constello, Control Superintendent, Brompton Pulp & Paper Co., Red Rock, Ont., Canada, a 1935 graduate of McGill University.

James W. Criss, Vinyl Service Manager, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., a 1920 graduate of Mississippi State College.

Howard P. Espenmiller, Research Engineer, Dilts Machine Works, Fulton, N. Y., a 1941 graduate of the New York State College of Forestry.

Kenneth M. Grasse, Student, Institute of Paper Chemistry, Appleton, Wis.

Lloyd B. Greiner, General Manager and Partner, Benlo Chemicals, 6515 West State St., Milwaukee, Wis. Attended Marquette University.

A. G. Hellstrom, Plant Chemical Engineer, Fraser Companies, Ltd., Edmundston, N. B., Canada, a 1941 graduate of McGill University.

Joe G. King, Chemist, Champion Paper & Fibre Co., Canton, N. C., a 1940 graduate of Antioch College.

Emil Kline, Chemical Control Manager, Industrial Rayon Corp., Cleveland, Ohio, a 1923 graduate of Cornell University.

Ferdinand Kraft, Chief Chemist, Marathon Paper Mills of Canada Ltd., Toronto, Ont., Canada, a graduate of the Technical University, Darmstadt, Germany.

Frank B. Lincoln, Jr., Physicist, Hollingsworth & Whitney Co., Waterville, Me., a 1943 graduate of George School of Technology.

Harry C. Merritt, Chief Engineer, Downingtown Mfg. Co., Downingtown, Pa., a 1920 graduate of Worcester Polytechnic Institute.

Otto H. Miller, Chemist, Beech-Nut Packing Co., Canajoharie, N. Y.

Herman Silfen, Chemist, Equitable Paper Bag Co., Inc., Long Island City, N. Y., a 1945 graduate of Brooklyn College.

Donald R. Simonds, Chief Engineer, Gould Paper Company, Lyons Falls, N. Y., a 1930 graduate of Worcester Polytechnic Institute.

Instrumentation Studies. LIV*

Penetration of Papers by Water Vapor. VIII.

A Controlled Relative Humidity Cabinet in Which Specimens May Be Weighed Without Removal from the Conditioned Atmosphere

By The Staff of The Institute of Paper Chemistry

Abstract

This report describes one type of constant relative humidity cabinet for measuring water vapor permeability or for determining the moisture equilibrium curves of pulp, paper, foods, etc., in which the specimens may be weighed without removing them from the conditioned atmosphere. Suggestions are given for the construction of controlled relative humidity cabinets. The measurement of relative humidity is discussed briefly.

In TAPPI Standard T 448 m-44 for water vapor permeability and in the high temperature and high relative humidity procedure described in Part III *(1)* of this series, all steps of the procedures are carried on in a conditioned room. The specimens, therefore, are not subjected to varying conditions of temperature and relative humidity. In some other water-vapor permeability methods (*cf. 2, 3*), conditioned cabinets are used and the specimen cups are removed from the cabinets for weighing. The outer surfaces of the specimens, therefore, are subjected to changes in temperature and relative humidity each time they are removed from the cabinet for weighing and each time they are returned to the cabinet for further storage under the testing conditions. The alternate expansions and contractions of the specimens caused by these changes in temperature and moisture content stress the seals and cause delamination of multiply specimens. The rapid change in weight of the cups upon removal from the cabinet and exposure to the laboratory atmospheric conditions add difficulty and uncertainty to the weighing operation.

Cabinets have been used in which the specimens are weighed by placing a balance on the cabinet, extending a rod from the pan hook on the beam through the base of the balance and through the top of the cabinet to a pan inside the cabinet, and manipulating the specimens through sleeves and gloves sealed to holes in the side of the cabinet. However, the use of such sleeves and gloves is a tedious and annoying operation, and often there is a considerable transfer of vapor through them when the water vapor pressure inside and outside the cabinet differs greatly.

The present report describes a cabinet construction which permits weighing of the specimens without removal from the cabinet. It employs a balance placed on the cabinet, as mentioned above, but the specimens are handled by mechanical means without the inconvenience of sleeves and gloves.

In addition to its application to water-vapor permeability procedures, the new cabinet arrangement should facilitate the determination of moisture-content and equilibrium relative humidity) for pulp, equilibrium curves (relationship between moisture paper, food products, etc.

This report also presents a brief discussion of the measurement of relative humidity.

Description of the Cabinet

A general view of the cabinet is shown in the sketch in Fig. 1. Figure 2 is a photograph showing the balance on top of the cabinet, a rotatable selector which carries the specimen cups, and part of the mechanism for rotating and lifting the selector. The cups are placed on the three annular rings or shelves of the specimen selector. A top view of this selector is presented in Fig. 3, and a view along the section AA of Fig. 3 is shown in Fig. 4. The three rings are supported by the shaft (3) which extends through the top of the cabinet. The balance is placed on the cabinet in such a position that a rod hooked to the left-hand pan hook of the balance hangs vertically, through appropriate holes in the base of the balance and the top of the cabinet, down to the fork shown in Figs. 1 and 2. This fork is represented by (13) in Fig. 5, which is a view along the section BB of Fig. 3. As shown in Figs. 2, 3, and 5, this fork bears three pairs of triangularly shaped hooks, upon which the cups rest during the weighing operation. The normal position of the selector is such that each pair of hooks lies slightly below the level of the associated annular ring (see Fig. 2). Thus, the selector may be rotated to bring any desired cup into position over an appropriate pair of hooks. When the selector is lowered, the hooks lift the cup from the shelf and the cup may be weighed. Figure 2 also shows one of the cups from the middle shelf suspended on the fork for weighing. Upon completion of the weighing operation, the selector is raised to replace the cup on the shelf and is then rotated to bring the next cup into position over the appropriate hooks of the fork.

The construction of the cabinet proper depends upon the temperatures and relative humidities to be maintained. The particular cabinet on which this report is based was intended for operation at 100°F. and low relative humidity. It was a double-walled plywood box with the space between the walls filled with redwood bark fiber. The inside of the cabinet was painted with molten wax to provide some protection against transfer of water vapor. The door shown in Fig. 1 carries a window comprised of two plates of glass with an air space between the two plates. The door closes against a soft rubber-tube gasket. The bottom is not fastened to the walls; a soft rubber tube acts as a gasket to seal the bottom edge of the cabinet to the thermally insulated and vapor-sealed bottom panel which rests on a table or other platform. This bottom is not shown in Fig. 1. Air circulation is provided by a fan which drives the air against and under the inclined panel on which

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The data contained in this report were submitted to the American Paper and Pulp Association as Report No. 30, Part VI, on February 15, 1944.

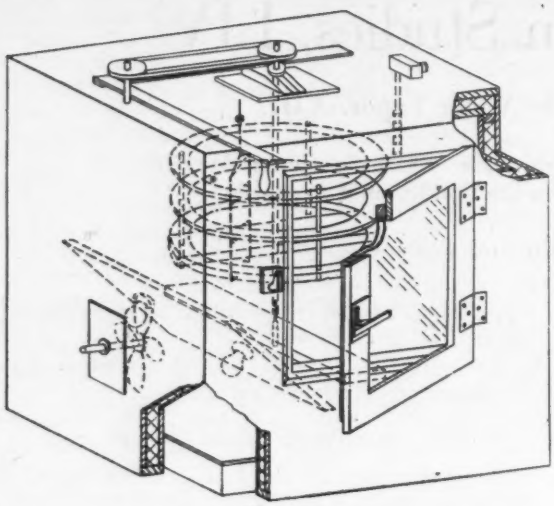

FIG. 1
General View of Water Vapor Permeability Cabinet

the heating lamps are mounted and over the enameled tray containing the saturated salt solution which controls the relative humidity within the cabinet. The air then passes up the opposite side of the cabinet, over the bimetallic thermoregulator, and back across the cabinet to the fan. The relative humidity within the cabinet is measured by the dew-point method. The dew-point apparatus is not shown in Fig. 1, but it can be seen just to the right of the specimen selector in Fig. 2. The air temperature is measured by a thermometer hung inside the cabinet or projecting through the top of the cabinet. Suggestions are made later in this report for variations in cabinet construction.

The vertical section of the selector shown in Fig. 4 illustrates the main features of the selector construction. The shaft (3) supports the shelves. This shaft passes through a hole in the board (9), which is fastened to the threaded portion of the shaft by washers and nuts (10). This board, in turn, supports the lower shelf (8) and the three bolts (6) which hold the two upper shelves (7). The upper shelves are held to the bolts by washers and nuts (4). The shelf rings are 1⅝ inches wide and are made from Masonite S-2-S Presdwood. The top surfaces of the shelves are coated with a self-vulcanizing rubber solution *(4)* to provide a surface on which the cups will not shift easily.

Referring to Fig. 5, the collar (19) is fastened to the shaft (3) by a set-screw. The weight of the selector is borne by this collar which rests on the wedge (20). Movement of this wedge along the plate (21) lowers the selector from the neutral to the weighing position or vice versa. The wedge is moved by means of the lever (2 of Fig. 3), which is pivoted at the right-hand end and conveniently operated from the front of the cabinet by means of arm (1). This arrangement is better illustrated in Figs. 1 and 2. The bottom end of the selector shaft is steadied by the pin (11 of Fig. 4), which fits loosely in the hole drilled in the end of the shaft. The length of this hole and the length of pin are selected to allow the required vertical motion of the shaft as the selector is raised and lowered. The pin is mounted in the board (12) which extends across the cabinet.

The shaft of the selector is in the middle of the cabinet top and is inconvenient to reach because of the balance. The pulley shown at the top of the shaft in Fig. 4 is connected by a belt to an idler pulley at the left-hand edge of the box, as shown in Figs. 1 and 2. Thus, the idler pulley can be turned with the left hand until the desired specimen cup is in position and the selector can then be lowered to the weighing position by pushing the handle of the operating lever toward the cabinet with the right hand. The cups on the selector can be seen through the window in the cabinet door.

The fork (13 of Figs. 3 and 5) and the hooked rod which connects it to the balance are made of iron rod. The short length of rod attached to the top of the fork is joined to the longer rod hanging from the beam of the balance by a threaded connection just above the top of the cabinet. Thus, the two may be separated for insertion into the balance and cabinet and then joined to form a rigid combination. The rod from the fork passes through a metal tube (17) of approximately 5/16-inch internal diameter which is set into the top of the cabinet as shown in Fig. 5. The three pairs of triangularly shaped hooks are brazed to the fork. The hooks were coated with a film of the self-vulcanizing rubber solution.

Operation of Cabinet

The desired saturated salt solution is placed in the tray and the tray is placed in the cabinet. The fan and heaters are turned on and the thermoregulator is adjusted to the desired temperature. The balance is placed on the cabinet, aligned, and leveled. The fork hook is engaged with the pan hooks of the balance beam. The position of the collar on the selector shaft is adjusted to position the selector shelves properly with respect to the hooks on the fork. When the cabinet has reached the equilibrium operating conditions, the fan is turned off, and the specimen cups are quickly placed on the shelves of the selector. The cups must be staggered on the shelves as illustrated in Fig. 2, so that any cup may be lifted for weighing without the possibility of either of the two unused pairs of hooks engaging or rubbing against cups on either of the other shelves. The fan is turned on as soon as the cups are in place.

When the specimens have experienced a suitable conditioning period (1 or 2 days), the selector is rotated to the proper position for lifting the first cup and the operating lever is pushed to lower the selector and leave the cup hanging on the fork. The weights are placed on the pan of the balance and the rider is adjusted until the necessary weight adjustment is within the range of the chain of the balance. The fan is then turned off and the final weight adjustment is made. The fan is turned on again before the weight is noted and recorded, so that the air circulation within the cabinet is interrupted for the minimum feasible time. The operating arm is pulled out to replace the cup on the selector shelf and the selector is rotated to permit lifting the next cup. The cups can thus be weighed at a rate equal to that of conventional procedures.

Suggested Variations in Cabinet Construction

Operation of the cabinet at high relative humidities and temperatures requires considerable attention to the details of thermal insulation and vapor sealing of the cabinet. If, for example, it is desired to operate at 100°F. and 95% relative humidity, the thermal insulation must be adequate to insure the temperature of the inside walls of the cabinet being above 98.3°F.,

which is the dew point for air having a relative humidity of 95% at 100°F. If the inside wall temperature falls to or below this value, condensation occurs and the relative humidity in the cabinet is limited approximately to the value corresponding to a dew point equal to the inner wall temperature. Because the temperature of the walls depends on the temperature of the air around the cabinet, the relative humidity in the cabinet would, in this case of inadequate thermal insulation, vary with the room temperature. If the insulation is sufficient to keep the inner wall temperature above the dew point, the relative humidity within the cabinet is independent of the surrounding room temperature.

The demands on the thermal insulation become less stringent as the desired relative humidity decreases or as the difference between operating temperature and room temperature decreases.

Not only must the general thermal insulation of the cabinet be adequate, but there must be a minimum number of metal parts projecting through the walls of the cabinet when high relative humidities are to be maintained at elevated temperatures. Because of their excellent thermal conductivity, such metal parts are almost certain to be below the dew-point temperature and, hence, condensation will occur on them. In most cases the temperature of these parts may be kept above the dew point by placing suitable lamps or heaters near the points at which they enter the cabinet. In a cabinet such as that described in this report, the parts likely to give trouble in this regard are the fan shaft, the conduits carrying the wires supplying the lamps or heaters in the cabinet, the thermoregulator, the selector shaft, the rod supporting the fork and the tube through which the rod passes, and the gasket which seals the door (particularly if the cabinet is metal lined). Condensation of water on the rod connecting the fork to the beam of the balance *must be avoided*. The condensate contributes to the apparent weight of the cup, and the amount of condensate varies so rapidly as to make the observed weights practically meaningless in the calculation of the water vapor permeability of the specimen. The balance must be shielded from the radiation of these lamps or heaters, particularly the ones which heat the fork rod and the selector shaft.

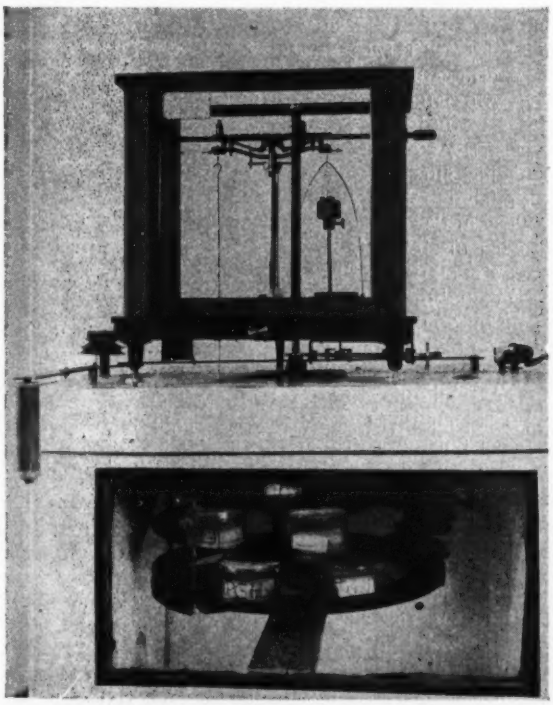

FIG. 2
Photograph of Water Vapor Permeability Apparatus and Balance with Cup in Position for Weighing

The vapor sealing of the cabinet is, of course, important when operation at high relative humidities is necessary. The sealing must be effective, not only to preserve the insulating value of the thermal insulation but also to permit satisfactory control of the relative humidity by means of the saturated salt solutions in the tray on the bottom of the cabinet. If the cabinet leaks vapor badly, evaporation from the exposed surface of the solution may not be rapid enough to maintain the cabinet at the equilibrium relative humidity of the solution. Therefore, the control will be poor because the rate of loss will vary with the vapor pressure in the room, inasmuch as this will control the vapor-pressure difference through the cabinet walls. Hence, the relative humidity within the cabinet will vary as the relative humidity of the room changes. Furthermore, rapid evaporation from the solution cools it below the temperature of the air and still further reduces the relative humidity.

Thorough and heavy coating inside the cabinet with asphalt or wax provides a usable seal. However, a sheet-metal lining with soldered joints or a lining of metal foil with carefully sealed joints is much more satisfactory.

The difficulty of controlling the relative humidity in any cabinet by means of saturated salt solutions increases as the difference between the water-vapor pressure inside and outside the cabinet becomes greater, regardless of whether the vapor pressure inside or outside is the larger. For example, suppose that the cabinet is operated at 100°F. and 20% relative humidity. Furthermore, assume that the room conditions are 72°F. and 15% relative humidity for considerable periods of time during the winter and are 85°F. and 75% relative humidity for periods during the summer. The pressure of saturated water vapor at 72°F. is 19.9 mm. of mercury. Hence, during the winter the vapor pressure in the room would be 3.0 mm. At 85°F., the pressure of saturated water vapor is 30.5 mm. and, hence, during the summer the vapor pressure in the room would be 22.9 mm. The vapor pressure inside the cabinet would be 20% of 48.7 mm., the saturated vapor pressure at 100°F., or 9.7 mm. Thus, during the winter water vapor would tend to pass from the cabinet to the room under a vapor pressure difference of 6.7 mm. and, during the summer, vapor would tend to pass into the cabinet under a vapor pressure difference of 13.2 mm. A similar argument applies to other operating conditions and it can be concluded that the vapor sealing of the cabinet is important at all seasons of the year and for all operating conditions in the cabinet.

As a digression, it may be helpful to point out at this time that the saturated salt solutions may be handled differently when the operating conditions are such that vapor tends to enter the cabinet than when vapor tends to leave the cabinet. In the first case, the salt solution in the tray should contain a considerable excess of the salt, so that small mounds or piles of the salt project above the surface of the liquid. This exposed salt is more effective in removing the incoming vapor from the air in the cabinet and, therefore, in maintaining the equilibrium

vapor pressure and relative humidity of the solution than is the level surface of the solution. In the second case—i.e., when the operating conditions are such that vapor leaves the cabinet—the control is more effective if there is a minimum excess of undissolved salt in the solution with no salt projecting above the surface of the solution.

In the cabinet described in this report, slight leakage of vapor cannot be avoided at the bearing of the fan shaft, at the hole in the top of the cabinet through which the fork rod passes, and at the hole through which the selector shaft passes. When the balance is not in use, the fork rod may be partially sealed in its surrounding tube by means of a split cork. The loss through the two bearings is not serious. A soft rubber-tube gasket is satisfactory around the door opening and under the bottom edge of the cabinet. The thermoregulator should be sealed into the opening by which it enters the cabinet by applying wax or other sealing compound. Wires which enter the cabinet through conduits or otherwise should be sealed into the conduit or opening with a compound suitable for electrical equipment. If the relative humidity is measured by the dew-point method, the opening around the tube should be sealed at the inner surface of the cabinet top.

For operation at high relative humidities, all metal parts in the cabinet should be made of stainless steel, brass, or other corrosion-resistant metal. The selector should also be constructed entirely of corrosion-resistant metal or other material which does not warp when continuously exposed to high relative humidities.

With the single fork used in the cabinet arrangement described in this report, the shelf space on the selector is not used efficiently because of the wasted space caused by the necessary staggering and wide spacing of the specimen cups on the individual shelves. If three forks are used, one for each shelf, the cups may be closer together and a considerably greater number placed on the shelves. Each of the three forks bears only a single pair of hooks; the positions of the hooks are determined by the position of the particular shelf with which the fork is to be used. Referring to Fig. 5, the individual forks of this multiple-fork arrangement do not include the short length of rod projecting through the top of the cabinet. The rod suspended from the beam of the balance is hook shaped at each end, so that it may be unhooked from the beam and the hook at the bottom end either engaged or disengaged from the notch of the shallow V at the top of a fork. When not in use, the forks are disengaged and sit upon and straddle the top shelf and rotate with the selector. They are arranged in sequence of length—e.g., with the longest one at the right and the shortest one at the left. The group of three occupy little space on the shelf, as the individual forks are spaced just far enough apart to allow the hook on the rod to engage one at a time. In operation, the hooked rod is grasped near its upper end, disengaged from the beam of the balance, manipulated to engage the lower hook in the longest fork, and the upper end rehooked to the beam. The selector is turned clockwise, when viewed from the top, until the nearest cup on the bottom shelf is in position to be lifted and weighed. The cups on the bottom shelf are successively weighed with rotation of the selector in the clockwise direction. The two forks which are not in use ride on the upper shelf and rotate with the selector during this series of weighing operations. After the last cup on the bottom

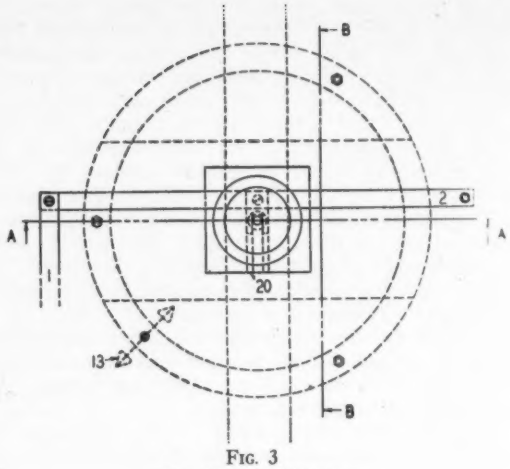

FIG. 3
Top View of Selector

shelf is weighed, the two disengaged forks are at the side and to the right of the suspended fork, and the selector cannot be rotated further in the clockwise direction because the two forks cannot be passed through the engaged fork. This long fork is then disengaged, and the fork on the right (i.e., the one of intermediate length) is engaged and the weighing sequence described above is repeated for the cups on the middle shelf. In turn, this second fork is disengaged and the process is repeated, using the remaining fork (the short one) to weigh the cups on the top shelf. At the end of the operation, all three forks are arranged in the original sequence, ready for the next cycle of weighing. Each of the three forks must be adjusted to have the same weight or each must be tared before each use. The same multiple-fork technique may be used with any reasonable number of shelves.

Measurement of Relative Humidity

The relative humidity in any space is defined as the ratio of the actual vapor pressure of water in that space to the saturated vapor pressure of water at the same temperature. The saturated vapor pressure of water is known for all ordinary temperatures, and tables of such values are available in all chemical handbooks.

The two most common laboratory procedures for determining relative humidity are the wet and dry bulb thermometer method and the dew-point method. The former is the more usual, because it is, in many cases, the more convenient. The Dunmore electric hygrometer *(5)* is a new instrument for measuring relative humidity which must be calibrated by means of one of the two more conventional methods. This electric hygrometer is particularly useful when it is desired to measure relative humidity in locations to which access is difficult or in which little space is available for equipment. These methods are described briefly and certain comments concerning them are given in the following paragraphs.

DEW-POINT METHOD

The dew-point method is basically a method of determining the actual water-vapor pressure in the region of interest. In outline, the method consists in cooling a highly polished metal surface until the first trace of fogging on the surface indicates condensation of moisture and then noting the temperature of the metal surface. The appearance of the trace of con-

densate on the metal surface indicates that the vapor in the immediate neighborhood of the surface is saturated. The temperature of the surface is the dew-point temperature. The saturated vapor pressure corresponding to the temperature of the surface is the actual vapor pressure in the space under study. The ratio of this vapor pressure to the saturated vapor pressure at the average temperature in the space is the relative humidity and is commonly multiplied by 100 to yield the relative humidity in percentage.

A simple and effective apparatus for dew-point determinations of relative humidity in a cabinet may be constructed in the following manner: A hole is blown in the side of a test tube having a diameter of 1.25 inches. This hole is located near the bottom of the tube and is reamed out to have a slight lip and a diameter of about ⅝ of an inch. The edge of the lip around the hole is ground on a flat metal or plate-glass surface with an abrasive powder until it is sufficiently plane to make continuous contact with a flat surface placed against it. A thin piece of highly polished stainless steel or aluminum is cut to a size just slightly larger than the hole and is cemented to the lip around the hole. A piece of a new stainless-steel spatula blade is very satisfactory for the metal plate and, although wax and other materials may be used for cementing the metal to the tube, a weather-strip cement has been found to be an unusually reliable cementing medium. The cement is confined to the outline of the hole and not allowed to run over the metal surface any more than necessary. The outer surface of the metal plate is then cleaned with a solvent or by polishing with white rouge. The tube is sealed into a suitable hole in the top of the cabinet with the bottom of the tube projecting into the cabinet as far as possible. The hole should be near the cabinet window. In case a rubber stopper is used to hold the test tube, it may be slipped on the tube before the hole is blown in the side. The tube is oriented so that the metal plate faces the window in the cabinet. A stirring device is made by bending a loop in the end of a heavy wire or small glass rod, so that liquid in the tube can be agitated by moving the wire or rod up and down in the tube. The loop is at right angles to the main shaft of the stirrer, so that it can slide up and down around a thermometer. A convenient handle is formed by making a right-angle bend at the top of the shaft.

Two thermometers are required; they should be calibrated and should agree to within 0.1°C. or 0.25°F. throughout their range. If they do not so agree, corrections must be made in use. The desirable range of the thermometers varies with the relative humidities to be measured and with the operating temperature of the cabinet. A range of 0° to 50°C., with thermometer divisions of 0.1°, is satisfactory for a wide range of conditions. One of the thermometers is hung in the cabinet and one is used in the tube of the dew-point apparatus.

A lamp (e.g., a goose-neck desk lamp) is placed so as to illuminate the metal plate through the window. The most suitable location for the light is found by trial. Water, at a temperature approximately that of the cabinet, is poured into the tube to a depth which covers the metal plate. Cold water or a salt which absorbs heat upon dissolving, such as ammonium nitrate, is *slowly* added with rapid stirring until the first sign of fogging of the highly polished metal surface is noted. The temperature of the water or solution in the tube is noted, as well as the temperature of the air in the cabinet, as indicated by the second thermometer. Stirring is continued and the temperature again noted as the fog disappears from the metal surface. The cooling of the tube must be slow, so that the first indication of fog may be noticed and the cooling stopped before a heavy condensate is formed. At the proper temperature, a change of less than 0.1°C. causes the fog to appear or disappear. The average temperature at which this transition occurs is the dew-point temperature. The relative humidity is obtained from the dew point and the air temperature as described in an earlier paragraph.

When the relative humidity is low, it is expedient to start with cold water in the tube — perhaps with shaved ice — and add the ammonium nitrate to cool the water still further. Temperatures below the freezing point of water can be obtained.

An important advantage of the dew-point method of measuring relative humidity is its independence of the air velocity over the apparatus.

Wet and Dry Bulb Thermometer Method

The wet and dry bulb thermometer method requires two calibrated and matched thermometers similar to those used with the dew-point method. The bulb of one thermometer is covered with a tightly fitting muslin sock which is wet with distilled water to provide the "wet bulb." These muslin socks can be purchased in the form of tubes of appropriate size for most thermometers. If the thermometers were designed for this use, their stems are necked down slightly at a point above the bulb. The top of the sock is fastened to the stem at this point by wrapping and tying with a strong thread. The sock is wet with distilled water and a loop of thread in the form of a single knot is placed around the sock and bulb at a point just above the tip of the bulb. As the knot is drawn tight, the loop slips over the rounded end of the bulb and stretches the wet sock tightly over the bulb. If the thermometers were not designed for this use and, therefore, do not have this neck in the stem, the top of the sock should be tied tightly to the stem at a distance above the bulb equal to the length

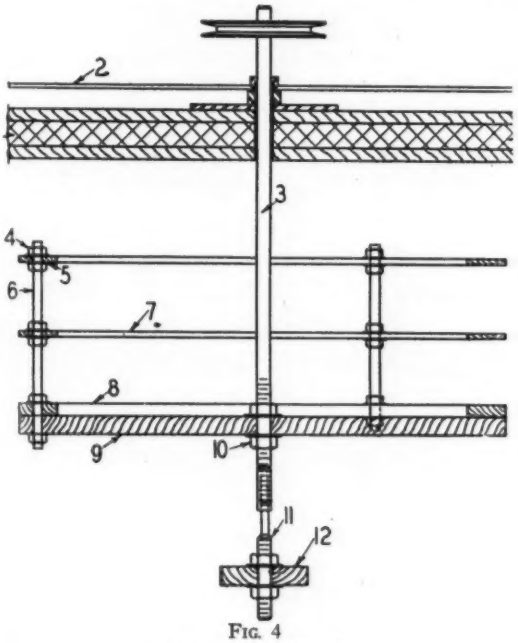

Fig. 4
Section AA of Selector

of the bulb. The sock is stretched and tied at the bottom as just described.

Because it is necessary to wet the sock each time a reading is made, it is necessary to mount the thermometers in the cabinet in such a way that they, or at least the wet-bulb thermometer, may be removed easily from the cabinet, or a contrivance must be devised for wetting the sock without removing the thermometer. A method sometimes used is to mount both thermometers in a two-hole rubber stopper which fits into a suitable opening in the cabinet. The wet-bulb thermometer should project through the stopper further than the dry-bulb thermometer by a distance equal to the length of the sock. The orientation of the thermometers in the cabinet should be so chosen as to place the wet bulb slightly "downstream" from the dry bulb.

The air velocity over the wet bulb is important; it should be at least 600 feet per minute. The reason for this requirement lies in the fact that the equilibrium temperature of the wet bulb is attained when the rate of gain in heat of the bulb caused by radiation and conduction from the surrounding walls and air equals the rate of loss caused by the evaporation of water from the sock. The rate of evaporation of water increases with increasing air velocity over the sock until velocities in the neighborhood of 600 feet per minute are reached. The United States Weather Bureau recommends a minimum velocity of 900 feet per minute. The tables relating air temperatures and wet-bulb depression to relative humidity are all based on observations during which air velocities of more than 600 feet per minute were employed. Henee, the thermometers should be mounted in the cabinet in such a position that the bulbs are directly in the air stream from the fan. A fan of the size of an ordinary office fan and operated at the same speed provides an adequate velocity at distances within 30 inches of the fan.

The operation of determining relative humidity with the wet and dry bulb thermometers consists in wetting the sock with distilled water, placing the thermometers in their proper position in the cabinet, noting the minimum reading of the wet-bulb thermometer after a period of at least one minute, and noting the reading of the dry-bulb thermometer. The difference between the readings of the dry and the wet bulb thermometers is the wet-bulb depression. All chemical handbooks include tables which list relative humidities corresponding to various dry-bulb temperatures and wet-bulb depressions. Psychrometric tables prepared by the Weather Bureau are obtainable from the Superintendent of Documents, Washington, D. C. *(7)*.

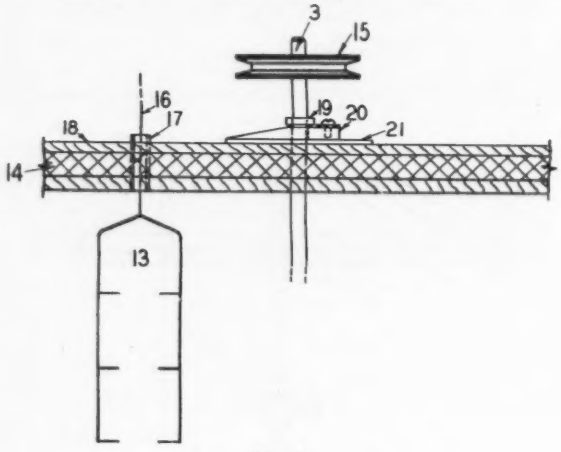

FIG. 5
Section BB of Selector

TAPPI SECTION, PAGE 86

ELECTRIC HYGROMETER

The electric hygrometer devised by Dunmore *(5)* is a considerably more complicated apparatus to prepare than the equipment for either of the two methods described above. It is mentioned here because there are occasions when it is necessary to measure the relative humidity in cabinets or other spaces in which there are no windows for use of the dew-point method, in which the air velocity is not adequate for the wet and dry bulb method, or in which there is not enough space to employ either the dew-point or the wet and dry bulb method. The electric hygrometer is a very useful and convenient instrument under such conditions. This instrument must be calibrated by either the dew-point method or the wet and dry bulb method; the calibration procedure is described in Part II of this series *(8)*.

Literature Cited and Notes

1. Institute of Paper Chemistry. Instrumentation Studies, XLIX. Techniques for measuring water vapor permeability. *Paper Trade J.* 119, No. 2: 23-29 (Jan. 13, 1944).
2. Symington, F. S., and Burroughs, R. F., *Fibre Containers* 28, No. 4: 107-109 (April, 1943).
3. Cartwright, L. C., *Tech. Assoc. Papers* 26: 65-66 (June, 1943).
4. Airvulc, manufactured by Self-Vulcanizing Rubber Company, Inc., 605 West Washington Boulevard, Chicago, Ill.
5. Dunmore, F. W., *J. Research Natl. Bur. Standards* 23, No. 6: 701-714 (Dec., 1939).
6. 3-M weatherstrip cement, manufactured by Minnesota Mining and Manufacturing Co., St. Paul 6, Minn.
7. Marvin, C. F. Psychrometric tables for obtaining the vapor pressure, relative humidity and temperature of the dew point. U. S. Department of Commerce, Weather Bureau, W. B. No. 235. Obtainable from the Superintendent of Documents, Washington, D. C. Price, 15 cents.
8. Institute of Paper Chemistry. Instrumentation Studies XLV. An electric sword hygrometer for measuring the relative humidity of air inside packages or other enclosures. *Paper Trade J.* 117, No. 1: 13-15 (July 1, 1943).

Manufacture of Quality Lime

An interesting and useful book entitled Economical Manufacture of Quality Lime from Large and Small Stone by Victor J. Azbe, consulting engineer, St. Louis, Mo., has just been issued. It is an 83 page volume (5½ x 8½) printed in photo offset and is presented to the lime industry in culmination of 25 years of consulting services to 100 lime plants by the writer. It presents factors governing the capacity and economy with various fuels, liquids, gaseous, and solid, and embraces vertical as well as rotary kilns.

The author states that there is much to be learned about lime and even the best posted should not be so presumptuous as to consider themselves authorities. The author certainly does not, and there is scarcely a page in this book on which he would not like to have available a greater amount of more certain data.

Success on obtaining quality lime centers around the factors of temperature, time and uniformity. With these factors under control a fine product, almost explosive in its reaction ability may be obtained.

Among the subjects covered are: lime kiln energy streams, lime kiln fuel efficiency, heat balance, effect of magnesia, silica, alumnia and iron on lime kiln fuel ratios, effect of incomplete combustion, instrumental gauging, gas volumes and flow, heat transfer, temperature difference zones, heat penetration, effect of chemical structure and several chapters outlining Mr. Azbe's methods.

Copies may be obtained from Y. N. Rauert, 6625 Delmar Boulevard, St. Louis 5, Mo., at $8.00 per volume.

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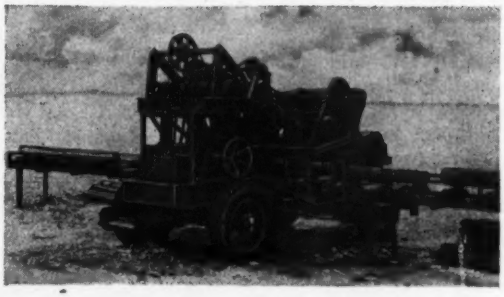

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The number of men required to operate the Nekoosa Portable Wood Peeler is determined by the layout of the wood handling equipment on the particular operation. Ten men can operate it without auxiliary equipment and produce as much peeled wood as 50 men peeling by hand. Auxiliary handling equipment will further eliminate labor.

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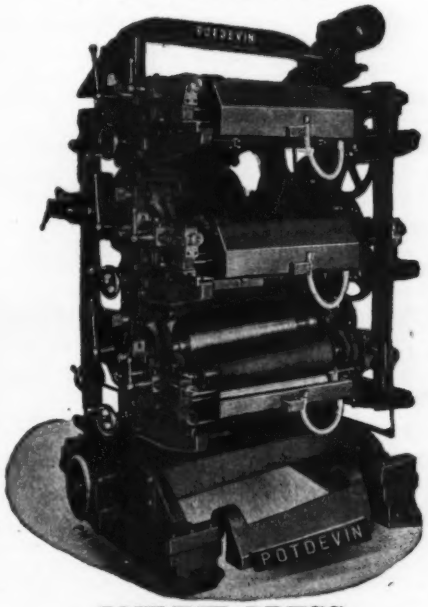

ANILINE PRESS

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New York Paper and Pulp Market Review

Demand For Book and Kraft Wrapping Paper High Above Supply —Wood Pulp Output For 1945 Was Higher At 10,165,000 Tons— Rags Active — Waste Paper Demand Heavy In Strong Market.

Office of the PAPER TRADE JOURNAL,
Wednesday, February 21, 1946.

All-over demand for paper is widely reported at a high level. Industry reports reflect continuing progress in improving the efficiency of mills. Inventories of paper are rising and reports from many manufacturers' representatives, jobbers, and general paper merchants indicate the expectation that demand for major grades of paper will continue heavy until the last quarter of this year.

Demand for book paper, uncoated and coated, is particularly heavy. Orders for publication paper and text book grades are currently far above supply.

Although what has been termed the unrealistic approach of OPA to the problems of the paper industry will exert great influence upon the paper industry and trade this year, the recent adjustments of price differentials in book, kraft and writing papers has created more optimism in the market. It is quite widely believed that the new wage-price policy of the Administration initiated for the steel industry must inevitably be distributed equitably to other industries, the prices of whose products are in need of upward adjustment.

Writing paper prices are reestablished for manufacturers on a new basis by OPA Amendment 9 to Maximum Price Regulation 450-writing and fine papers. This section, like others covering book, and kraft papers covers the trend of selling paper in rolls. It permits manufacturers to charge more for sheets in some types of paper. The new ceilings are in dollar and cents on a jumbo roll basis, and applicable to the whole industry. It does not include writing paper weighing less than 11 pounds per 500, 17 by 22 inch sheets.

Manufacturers' ceiling prices for kraft wrapping paper in sheets and counter rolls have been increased 25 cents per cwt., effective February 19 in Amendment 13 to MPR-182.

The index of general business activity for the week ended February 9 declined to 112.6, from 113.5 in the previous week, compared with 141.4 for the corresponding week in 1945. The index of paperboard production was 150.1, compared with 148.4 in the previous week, and with 149.4 for the corresponding week in 1945.

Paper production for the week ended February 9 was estimated at 99.7%, compared with 90.1% for 1945, with 89.6% for 1944, with 88.4% for 1943, and with 103.4% for the corresponding week in 1942.

Paperboard production for the week ended February 9 was 93.0%, compared with 93.0% for 1945, with 97.0% for 1944, with 87.0% for 1943, and with 101.0% for the corresponding week in 1942.

Wood Pulp

Wood pulp production in 1945 totaled an estimated 10,165,000 tons, compared with 10,108,000 tons in 1944. This small increase was the remainder of a considerably larger increase achieved in the first half of the year. Production in that period was 228,000 tons more than in 1944. In the second half of 1945, production declined 171,000 tons from 1944.

Rags

Mill buying of cotton cuttings is reported active this week. Demand is heavy and some reports indicate that supplies are inadequate to fill orders at this date. The market is strong with prices firm at ceiling levels.

Demand for old cotton rags is active this week. The market is strong, with roofing felt mills buying in heavy volume. Prices are firm at ceiling levels.

Old Rope and Bagging

Reports this week indicate that Manila fiber is in strong demand but little trading is being done in other fibers. Demand for mixed strings is light at around 1.50.

Trading in scrap bagging is limited so far as mills are concerned. The market is irregular and prices are reported unstable and of a nominal nature at this date. Supplies are still reported as limited.

Old Waste Paper

Mill demand for all major grades of paper stock is reported heavy at this date. Board mills are particularly eager to build up their inventories. Shavings, books, ledgers, folded news, mixed paper and old corrugated are the major packings in heaviest demand this week. Prices are strong at ceiling levels.

Newsprint Up in January

Production in Canada during January, 1946 amounted to 328,414 tons and shipments to 316,320 tons. Production in the United States was 67,819 tons and shipments were 66,102 tons. The output in Newfoundland was 30,786 tons and shipments were 29,775 tons making a total North American production of 427,019 tons and shipments of 412,197 tons. Total production in January, 1945 was 351,737 tons and shipments were 312,519 tons.

The Canadian mills produced 63,648 tons more in January, 1946 than in January, 1945, which was an increase of 24.0 percent. The output in the United States was 7,438 tons or 12.3 percent above that in January, 1945; in Newfoundland production was 4,196 tons or 15.8 percent more, making a total increase of 75,282 tons, or 21.4 percent more than in January, 1945 and was greater than in any January on record.

Stocks of news print paper at the end of January were 92,454 tons at Canadian mills, 8,057 tons at United States mills, and 57,372 tons at Newfoundland mills, making a combined total of 157,883 tons compared with 143,061 tons on December 31, 1945, and 144,303 tons at the end of January, 1945. During the winter some tonnage is accumulating at points from which water shipments later will be made.

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Solution-Lifting Steam Gun Saves Maintenance Cleaning Time

You can save much valuable time cleaning equipment with the Oakite Solution-Lifting Steam Gun. This modern mechanical cleaning weapon utilizes heat and force to intensify detergent action of the Oakite cleaning compound solution.

This scientific dirt-dynamiter is strongly recommended for removing long standing deposits of a tenacious type, or for use in cleaning difficult-to-get-at areas.

The Oakite Gun may also be used for wet-steam rinsing of souring wires after cleaning; for removing grime, fibre, etc., from cylinder wires; for removing slime from save-all screens. Other suggested uses for the Gun are given in specially prepared 28-page Mill Maintenance Cleaning Handbook. A FREE copy will be gladly mailed on request. Write TODAY!

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BLEACHED SULPHITE AND SODA PULP
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Williamsburg, Pennsylvania
Charleston, South Carolina

Which is the ideal heavy-duty slitter and roll-winder for converting, at high speed, plain, waxed, gummed and coated papers and boards?

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MISCELLANEOUS MARKETS

Office of the PAPER TRADE JOURNAL,
Wednesday, February 21, 1946.

BLANC FIXE—The market for blanc fixe is reported steady for the week. Current demand continues fair. The pulp is currently quoted at $40 per ton, in barrels, at works; the powder is currently quoted at $60 per ton.

BLEACHING POWDER—Demand is currently reported active. Bleaching powder is currently quoted at from $2.50 to $3.10 per 100 pounds. All prices in car lots, in drums, f.o.b. works.

CASEIN—OPA maximum prices on processed acid-precipitated casein are as follows: 10,000 pounds or more, 24 cents per pound; 2,000 pounds, 24¼ cents per pound; less than 2,000 pounds, 24¾ cents per pound, f.o.b. shipping point. Imported, 24 cents per pound.

CAUSTIC SODA—Supply situation continues short. No material improvement reported this week. Solid caustic soda is currently quoted at $2.30 per 100 pounds. The flake and ground are currnetly quoted at $2.70 per 100 pounds. Al prices are in car lots, in drums, f.o.b. works.

CHINA CLAY—Demand for most grades of china clay is reported good this week. Supply situation is tight. Domestic filler clay is currently quoted at from $7.50 to $15 per ton; coating clay is quoted at from $12 to $22 per ton, at mines. Imported china clay is currently quoted at from $13 to $25 per long ton, ship side.

CHLORINE — Demand heavy. Production good. Shortage of tank cars and cylinders slows delivery. Chlorine is currently quoted at $1.75 per 100 pounds. in single-unit tank cars, f.o.b. works.

ROSIN—No offering or sales. OPA prices: "G" gum rosin at $6.74 per 100 pounds, in barrels, Savannah. "FF" wood rosin is currently quoted at $6.70 per 100 pounds in barrels, New York. Average price of 70% gum rosin size is currently offered at $6.95 per 100 pounds, f.o.b. works.

SALT CAKE—Demand reported good. Quotations on salt cake continue to remain unchanged. Domestic salt cake is currently quoted at $15 per ton; chrome cake at $16 per ton.

SODA ASH—Market demand for soda ash continue heavy. Bulk shipments fairly prompt. Bagged lots slow for lack of labor. Prices continue unchanged. Prices on soda ash in car lots, per 100 pounds, are as follows: in bulk, $.90; in paper bags, $1.05; and in barrels, $1.35.

STARCH—Receipts higher this week at 1,988,000 bushels and above last year. Shipments lower. Corn prices are steady. Starch quotations continue unchanged. Pearl is currently quoted at $3.72 per 100 pounds. The powdered grade is currently quoted at $3.83 per 100 pounds. All prices f.o.b. Chicago.

SULPHATE OF ALUMINA—Supply situation still under normal balance. Quotations are unchanged. Prices on the commercial grades are quoted at from $1.15 to $1.25 per 100 pounds. The iron free is currently quoted at $1.75 per 100 pounds. All prices in car lots, in bags, f.o.b. works.

SULPHUR—Demand is reported active for sulphur Quotations on all grades continue unchanged. Annual contracts are currnetly quoted at $16 per long ton, f.o.b. mines. The current contract prices at Gulf Ports remains unchanged at $17.50 per long ton.

TALC—The market for domestic talc is reported fair this week. Quotations unchanged. Domestic grades are quoted at from $16 to $21 per ton, at mines. Canadian $24 per ton. All prices in car lots.

MARKET QUOTATIONS

All market quotations, excepting those otherwise designated as official OPA maximum prices, are based on the manufacturers' price level as of October 1-15, 1941; maximum wholesale prices are based on the merchants' maximum prices for stipulated quantities at a quoted price to all customers of a like class, as shown by the merchant's sales records of goods delivered during March, 1942. A merchant's price list in effect in March 1942, showing quotations of actual shipments, will establish the current maximum prices.

Paper

(Delivered New York)

Standard News, per ton—			
Roll, contract	*$61.00	@	—
Sheets	69.00	@	—
* OPA Maximum Price.			
Kraft—per cwt.—Carload Quantities Zone A, Delivered			
Superstandard Wrapping	*$5.25	@	—
No. 1 Wrapping	*5.00	"	—
Standard Wrapping	*4.75	"	—
Standard Bag	*4.375	"	—
* OPA Manufacturers' Prices.			
Tissues—Per Ream—Carlots			
White No. 1	1.12½	"	—
White No. 1 M. G.	1.10	"	—
White No. 1½	1.00	"	—
White No. 2	.90	"	—
Anti-Tarnish M.F.	1.20	"	—
Colored	—	"	—
Kraft	.95	"	—
Manila	.90	"	—
Toilet—1 M. Sheets—Per Case			
Unbleached	4.25	"	—
Bleached	5.70	"	—
Unbl. Toilet, 1 M.	4.16	"	—
Bleached Toilet	5.70	"	—
Paper Towels, Per Case—			
Unbleached, Jr.	2.20	"	—
Bleached, Jr.	3.20	"	—
Manila—per cwt.—C. l. f. a.			
No. 1 Jute	11.25	@	—
No. 1 Manila Wrapping, 35 lb.	6.00	"	6.25
No. 2 Manila Wrapping, 35 lb.	5.75	"	6.00
Boards, per ton—			
News	*54.00	@	—
Chip	*54.00	@	—
Sgl. Mla. L1. Chip	*65.00	@	—
White Pat. Coated	*79.00	@	—
Kraft Liners 50 lb.	*63.00	"	—
Binders Boards	84.00	"	116.00

* OPA Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following are representative of distributors' resale prices:

Rag Content Bonds and Ledgers—White, Assorted Items
Delivered in Zone 1:

	Bonds	Ledgers
100% Rag Ext. No. 1	$39.10@$46.00	$40.25@$47.25
100% Rag	32.20 " 37.75	33.35 " 39.25
85% Rag	.... "	29.90 " 35.00
75% Rag	23.00 " 27.00	24.15 " 28.25
65% Rag	.... "	22.80 " 27.75
50% Rag	18.70 " 22.75	19.90 " 24.25
25% Rag	16.40 " 20.00	17.55 " 21.50

Colors at $1.00 cwt. extra.

Sulphite Bonds and Ledgers—White, Assorted Items
Delivered in Zone 1:

	Bonds	Ledgers
No. 1	$10.55@$12.75	$11.70@$14.25
No. 2	9.65 " 11.75	10.80 " 13.25
No. 3	9.20 " 11.25	10.35 " 12.50
No. 4	8.90 " 10.75	10.05 " 12.25

Colors $1.00 cwt. extra.

Free Sheet Book Papers—White, Cased Paper
Delivered in Zone 1:

No. 1 Glossy Coated	$13.65@	$15.50
No. 2 Glossy Coated	12.40 "	14.00
No. 3 Glossy Coated	11.60 "	13.25
No. 4 Glossy Coated	11.15 "	12.75
No. 1 Antique (watermarked)	10.25 "	11.75
No. 2 Offset	9.60 "	11.00
A Grade E. F.	9.35 "	10.75
A Grade S. & S. C.	9.60 "	11.00
B Grade E. F.	8.85 "	10.25
B Grade S. C.	9.10 "	10.50
C Grade E. F.	8.55 "	9.75
C Grade S. C.	8.80 "	10.00
D Grade E. F.	8.25 "	9.50
D Grade S. & S. C.	8.50 "	9.75

Ivory & India at $.50 cwt. extra.

Wood Pulp

OPA Maximum Prices and Canadian Manufacturers' Prices, Less Freight. Not Exceeding OPA Allowances.

Bl. Softwood Sulphite	$86.00
Unbl. Softwood Sulphite	74.00
Bl. Hardwood Sulphite	83.50
Unbl. Hardwood Sulphite	71.50
Bl. Mitscherlich	81.00
Unbl. Mitscherlich	72.00 @ 82.00
N. Bleached Sulphate	86.00
S. Bleached Sulphate	79.00
N. Semi-Bleached Sulphate	82.00
S. Semi-Bleached Sulphate	75.00
N. Unbl. Sulphate	73.00
S. Unbl. Sulphate	63.50
Bl. Soda	76.00
Unbl. Soda	72.00
Groundwood	50.00

Transportation Allowances

Applying to Producers of Wet Wood Pulp.

	Below 50% Air Dry Weight
Northeast	$13.50
Lake Central	13.50
Southern	16.00
West Coast (in area)	10.50
West Coast (out area)	16.50

	50%-80% Air Dry Weight
Northeast	$11.50
Lake Central	11.50
Southern	14.00
West Coast (in area)	9.50
West Coast (out area)	15.50

Applying to Producers of Dry Wood Pulp.

	Above 80% Air Dry Weight
Northeast	$8.50
Lake Central	8.50
Southern	11.00
West Coast (in area)	7.50
West Coast (out area)	13.50

Should freight charges actually exceed these allowances, the difference may be added to the maximum prices.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—			
New White, No. 1	6.50	@	7.25*
Silesias No. 1	—	"	5.75*
New Unbleached	6.75	"	7.50*
Blue Overall	—	"	5.50*
Fancy	—	"	3.50*
Washables	—	"	3.00*
Bleached Khaki Cuttings	—	"	4.25*
Unbleached Khaki Cuttings	—	"	3.50*

* OPA Maximum Prices.

TENAX

"TENAX FELTS ARE TOUGH"

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REELS AND WINDERS
STUFF AND FAN PUMPS
ROLLS OF ALL KINDS

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PAPER TESTING INSTRUMENTS

ENGINEERING, SURVEYING, HYDRAULIC ENGINEERING AND METEOROLOGICAL INSTRUMENTS.

Write for Catalogs

W. & L. E. GURLEY

TROY, N. Y., U. S. A.

Old Rags

White, No. 1—			
Repacked	*3.80	@	—
Miscellaneous	*3.20	"	—
White, No. 2—			
Repacked	*2.90	"	—
Miscellaneous	*2.65	"	—
Thirds and Blues—			
Repacked	*2.20	"	—
Miscellaneous	*1.30	"	—
Roofing Rags—			
No. 1	*1.55	"	—
No. 2	*1.45	"	—
No. 3 (bagging)	*1.35	"	—
No. 4	*1.35	"	—
No. 5A	*1.35	"	—
Old Manila Rope	5.75	"	—

* OPA Maximum Prices.

Foreign Rags

Pre-War Quotations
All Prices Nominal

New Rags

New Dark Cuttings	2.25	@	2.40
New Mixed Cuttings	2.00	"	2.20
New Light Silesias	5.50	"	5.75
Light Flannelettes	5.50	"	5.75
New White Cuttings	7.00	"	7.50
New Light Oxfords	4.00	"	4.50
New Light Prints	3.00	"	3.25

Old Rags

No. 1 White Linens	7.50	"	8.50
No. 2 White Linens	6.50	"	7.50
No. 3 White Linens	4.50	"	—
No. 4 White Linens	2.25	"	3.25
No. 1 White Cotton	4.25	"	4.75
No. 2 White Cotton	3.25	"	3.75
No. 3 White Cotton	2.50	"	3.00
No. 4 White Cotton	1.90	"	2.20
Extra Light Prints	2.00	"	2.40
Ord. Light Prints	1.75	"	2.15
Med. Light Prints	1.55	"	1.95
Dutch Blue Cottons	2.25	"	2.50
French Blue Linens	3.00	"	—
Checks and Blues	2.00	"	—
Linsey Garments	1.90	"	2.00
Dark Cottons	1.50	"	1.60
Old Shopperies	1.30	"	1.45
New Shopperies	1.45	"	1.50
French Blues	2.25	"	2.50

BAGGING

(Prices to Mill, f. o. b. N. Y.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	3.25	@	3.30
Wool Tares, light	3.25	"	3.50
Wool Tares, heavy	3.50	"	3.75
Bright Bagging	3.25	"	3.50
Manila Rope—			
Foreign	—	"	—
Domestic	*5.75	"	—
Jute Threads	5.50	"	—
No. 1 Sisal Strings	*4.00	"	—
Mixed Strings	1.50	"	—

* OPA Maximum Prices.

Old Waste Papers

(F. o. b. New York)

OPA Maximum Prices, Baled

No. 1 Hard White Envelope Cuts, one cut	3.37½	@	—
No. 1 Hard White Envelope Cuts	3.12½	"	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
No. 1 Hard White Shavings, ruled	2.50	"	—
Soft White Shavings, one cut	2.87½	"	—
No. 1 Soft White Shavings	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Mixed Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
Mixed Groundwood Colored Shavings	.90	"	—
Overissue Magazines	1.67½	"	—
No. 1 Heavy Books & Magazines	1.92½	"	—
Mixed Books	1.10	"	—
No. 1 White Ledger	2.30	"	—
No. 2 Mixed Ledger, colored	2.00	"	—
New Manila Envelope Cuttings, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
Extra Manilas	1.95	"	—
Mixed Kraft, Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
Triple Sorted, No. 1 Brown Soft Kraft	2.50	"	—
New 100% Kraft Corrugated Cuttings	2.25	"	—
No. 1 Assorted Old Kraft	1.75	"	—
New Jute Corrugated Cuttings	.90	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.40	"	—
Box Board Cuttings	.72½	"	—
White Blank News	1.65	"	—
Overissue News	1.10	"	—
No. 1 News	1.00	"	—
No. 1 Mixed Paper	.95	"	—
Old Corrugated Containers	.82¼	"	—
Mill Wrappers	1.10	"	—

Twines

All Prices Nominal

(F. o. b. Mill)

(Soft Fiber)

Coarse Polished—			
India	.21	@	—
White Hemp	.21	"	—
Fine Polished—			
Fine India	.26	"	—
Unpolished—			
Box	.17¼	"	—
Paper Makers	.17	"	—
Tube Rope	.19	"	—
Wall Paper	.20½	"	—
Wrapping	.23	"	—
Soft Fiber Rope	.19	"	—
Cotton	.25	"	—

(Hard Fiber)

Medium Java	.18	"	—
Mex. Sisal	.16	"	—
Manila	—	"	—

PHILADELPHIA

Domestic Rags (New)

(Price to Mill)

Shirt Cuttings—	
New White No. 1	.07¼
New White No. 2	.05¾
Light Silesias	.05¾
Black Silesias, soft	.03¾
New Unbleached	.07½
Washable Prints	.04¼
Washable No. 1	.03
Blue Overall	.05½
Cottons—According to grades—	
Washable Shredding	.01¾
Fancy Percales	.04¾
New Black Soft	.03¼
Khaki Cuttings—	
Unbleachable Cotton Cuttings	.03½
Bleachable Cotton Cuttings	.04½
Men's Corduroy	.03½
Ladies' Corduroy	.03
Cottonades	.03¼

Domestic Rags (Old)

White No. 1—Repacked	3.80	@	—
Miscellaneous No. 1	3.20	"	—
Miscellaneous No. 2	2.65	"	—
White No. 2—Repacked	2.90	"	—
Thirds and Blues—			
Miscellaneous	1.80	"	—
Repacked	2.20	"	—
Black Stockings—			
(Export)	Nominal		
Roofing Stock—			
Foreign No. 1	Nominal		
Domestic No. 1	1.55	"	—
Domestic No. 2	1.45	"	—
Roofing Bagging	1.35	"	—
Old Manila Rope	5.75	"	—

Bagging

(F. o. b. Phila.)

Gunny No. 1—			
Foreign	Nominal		
Domestic	3.00	@	3.50
No. 1 Clean Bright—			
Sisal Strings	.04	"	—
No. 2 Clean Bright—			
Sisal Strings	.03	"	—
Sisal Jute	.02½	"	.02¾
Scrap—			
No. 1	3.25	"	3.50
No. 2	1.75	"	1.80
Wool Tares, heavy	4.00	"	4.25
No. 1 New Light Burlap	3.00	"	4.00
New Burlap Cuttings	3.75	"	4.00

Old Papers

(F. o. b. Phila.)

OPA Maximum Prices, Baled

No. 1 Hard White Envelope Cuts, one cut	3.37½	@	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
Soft White Shavings, one cut	2.50	"	—
White Blank News	1.65	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Hard White Shavings	2.87½	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
Hard White Envelope Cuts, one cut	3.37½	"	—
Triple Sorted No. 1 Brown Soft Kraft	2.50	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
No. 1 Heavy Books & Magazines	1.92½	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
White and Colored Tabulating Cards	2.25	"	—
Ground Wood Tabulating Cards	1.35	"	—
White Blank News	1.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.95	"	—
Overissue News	1.10	"	—
Box Board Cuttings	.72½	"	—
New Corrugated Cuttings, Kraft	2.25	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.40	"	—
Jute Corrugated Cuttings	1.07½	"	—

Bagging

(F. o. b. Boston)

Gunny Bagging—			
Foreign	(nominal)		
Domestic	2.75	@	2.90
Sisal Rope No. 1	*4.75	"	—
Sisal Rope No. 2	* —	"	4.00
Mixed Rope	1.60	"	—
Transmission Rope—			
Foreign	(nominal)		
Domestic	2.75	"	3.00
Manila Rope—			
Foreign	(nominal)		
Domestic	5.75	"	—
Soft Jute Rope	4.50	"	5.00
Jute Carpet Threads	3.00	"	3.50
Bleachery Burlap	8.50	"	9.00
Scrap Burlap—			
Foreign	(nominal)		
Domestic	3.00	"	3.25
South America	—	"	3.25

BOSTON

Old Papers

(F. o. b. Boston)

OPA Maximum Prices, Baled

No. 1 Hard White Shavings, unruled	2.87½	@	—
No. 1 Hard White Shavings, ruled	2.50	"	—
Soft White Shavings, Misc.	2.15	"	—
No. 1 Fly Leaf Shavings	1.67½	"	—
No. 2 Fly Leaf Shavings	1.12½	"	—
No. 1 Groundwood Fly Leaf Shavings	1.25	"	—
No. 2 Groundwood Fly Leaf Shavings	.90	"	—
Mixed Colored Shavings	.75	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
Hard White Envelope Cuts, one cut	3.37½	"	—
Triple Sorted No. 1 Brown Soft Kraft	2.50	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
Kraft Envelope Cuttings	3.25	"	—
No. 1 Heavy Books & Magazines	1.92½	"	—
New Manila Envelope Cuts, one cut	2.87½	"	—
New Manila Envelope Cuttings	2.65	"	—
White and Colored Tabulating Cards	2.25	"	—
Ground Wood Tabulating Cards	1.35	"	—
White Blank News	1.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.95	"	—
Overissue News	1.10	"	—
Box Board Cuttings	.72½	"	—
New Corrugated Cuttings, Kraft	2.25	"	—
Old 100% Kraft Corrugated Containers	1.75	"	—
Old Corrugated Containers	1.40	"	—
Jute Corrugated Cuttings	1.07½	"	—

Bagging

(F. o. b. Boston)

Gunny Bagging—			
Foreign	(nominal)		
Domestic	2.75	@	2.90
Sisal Rope No. 1	*4.75	"	—
Sisal Rope No. 2	* —	"	4.00
Mixed Rope	1.60	"	—
Transmission Rope—			
Foreign	(nominal)		
Domestic	2.75	"	3.00
Manila Rope—			
Foreign	(nominal)		
Domestic	5.75	"	—
Soft Jute Rope	4.50	"	5.00
Jute Carpet Threads	3.00	"	3.50
Bleachery Burlap	8.50	"	9.00
Scrap Burlap—			
Foreign	(nominal)		
Domestic	3.00	"	3.25
South America	—	"	3.25
Wool Tares—			
Foreign	(nominal)		
Domestic	4.25	"	—
Aust. Wool Pouches	—	"	3.65
New Zealand Wool Pouches	—	"	3.50
New Burlap Cuttings	4.75	"	5.00
Heavy Baling Bagging	4.00	"	4.25
Paper Mill Bagging	2.50	"	3.00
No. 2 Roofing Bagging	1.35	"	—

* OPA Maximum Prices.

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.04½	@	.04¾
Fancy Percales	.04¾	"	.05
New White No. 1	.06¾	"	.07
New Light Flannelettes	.05½	"	.06
Canton Flannels, Bleached	.06	"	.06¼
Underwear Cutters, Bleached	.06¼	"	.06¼
Underwear Cutters, Unbleached	.05¾	"	.06
Silesias No. 1	.06	"	.06¼
New Black Silesias	.03	"	.03¼
Red Cotton Cuttings	.03½	"	.04
Soft Unbleached	.06½	"	.06¾
Blue Cheviots	.05½	"	.06
Fancy	.02¾	"	—
Washable	.02¾	"	—
Khaki Cuttings	.02¾	"	.03
O. D. Khaki	.03½	"	.03¾
Corduroy	.03¼	"	.03½
New Canvas	.06¼	"	.06½
B. V. D. Cuttings	.06¼	"	.06½

Domestic Rags (Old)

(F. o. b. Boston)

White No. 1—			
Repacked	3.80	@	—
Miscellaneous	3.20	"	—
White No. 2—			
Miscellaneous	2.65	"	—
Twos and Blues, Repacked	2.20	"	—
Old Blue Overalls	2.25	"	2.50
Thirds and Blues, Repacked	2.20	"	—
Miscellaneous	1.80	"	—
Black Stockings	3.50	"	4.00
Roofing Stock—			
No. 1	1.55	"	—
No. 2	1.45	"	—
No. 3	1.35	"	—
No. 4	1.35	"	—
No. 5, Quality A	1.35	"	—
Quality B	1.20	"	—
Quality C	.95	"	—
Old Manila Rope	5.75	"	—

* OPA Maximum Prices.

Foreign Rags

(F. o. b. Boston)

Canvas	(nominal)
Dark Cottons	(nominal)
Dutch Blues	(nominal)
New Checks and Blues	(nominal)
Old Fustians	(nominal)
Old Linsey Garments	(nominal)
New Silesias	(nominal)

CHICAGO

Waste Paper

(F. o. b. Chicago)

OPA Maximum Prices, Baled

Shavings—			
No. 1 Hard White Envelope Cuts, one cut	3.37½	@	—
No. 1 Hard White Shavings, unruled	2.87½	"	—
No. 1 Soft White Shavings	2.50	"	—
No. 1 White Ledger	2.30	"	—
No. 1 Heavy Books & Magazines	1.92½	"	—
White Blank News	1.65	"	—
Mixed Kraft Env. & Bag Cuttings	2.75	"	—
No. 1 Assorted Old Kraft	1.75	"	—
Overissue News	1.10	"	—
No. 1 News	1.00	"	—
No. 1 Mixed Paper	.95	"	—
No. 1 Roofing Rags	1.55	"	—
No. 1 Roofing Bags	1.45	"	—
Misc.	2.15	"	—
No. 1 White Ledger	2.30	"	—
No. 2 Ledger, colored	2.00	"	—
No. 1 Heavy Books & Magazines	1.92½	"	—
Overissue Magazines	1.67½	"	—
New Manila Envelope Cuttings	2.65	"	—
No. 1 Assorted Old Kraft	1.75	"	—
No. 1 Mixed Paper	.95	"	—
Box Board Cuttings	.72½	"	—
Kraft Corrugated Cuttings	2.25	"	—
Old Corrugated Containers	1.40	"	—
Overissue News	1.00	"	—
No. 1 News	1.00	"	—